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Assuring a Continuum of Care for Heart Failure Patients Through Post-Acute Care Collaboration

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Assuring a Continuum of Care for Heart Failure Patients Through Post-Acute Care Collaboration

Abstract

Background: Heart failure (HF) patients have a high risk of rehospitalization after discharge from acute care. Post-discharge management of HF patients requires coordinating services outside the hospital setting, such as skilled nursing and home health care to address patients' complex needs.

Local Problem. High HF readmission rates negatively impact a hospital's efficiency and pose a risk of financial penalties. In the project setting, the HF patients discharged to skilled nursing facilities and home health agencies had a higher rate of 30-day readmission than patients discharged to home.

Methods: Fourteen post-acute care (PAC) facilities were selected for the interventions. The medical center and 14 PACs collaborated to build a pathway based on the Coordination Networks Multi-Level Framework. The 30-day all-cause readmission rate of the participating PACs was compared pre- and post-intervention.

Interventions: An evidence-based HF Continuum of Care pathway was implemented with six key interventions: HF patient identification during transition, discharge handoff optimization, post-discharge follow-up, information sharing, inter-organization feedback, and enhancement of nursing knowledge on transitions of care.

Results: Post-implementation, the 30-day readmission rate decreased from 25% to 20% (n=50, p= .466); the completion rate for follow-up phone calls within 48 hours of discharge increased from 90% to 96% (p= .208); discharge appointments were made within ten days for 72% of

patients HF transitions of care knowledge assessment of cardiology nurses increased to 4.5% post-education (84.4%) compared to the pre-education (80.8%) (p=.578).

Conclusions: In heart failure patients, post-acute care collaboration using a continuum of care pathway reduced the 30-day readmission rate of patients discharged to partnered PACs.

Key Words: *Collaborative care, continuum of care, coordination of care, heart failure, multi-level framework, readmission rate, transitions of care*

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Background

The number of U.S. adults living with heart failure (HF) is projected to reach eight million by 2030, a 46% increase from 2012 (Virani et al., 2021). By comparison, the cost of HF management is projected to increase by 127%, from $30.7 billion in 2012 to $69.8 billion by 2030 (Benjamin et al., 2019; Virani et al., 2021). A key cost driver for HF management is 30-day hospital readmissions (Van Spall et al., 2018). Reducing the 30-day readmission rate is a high priority for the Centers for Medicare and Medicaid Services (CMS), addressed through the Hospital Readmission Reduction Program (HRRP) of the 2010 Affordable Care Act (CMS, 2020). The HRRP penalizes hospitals up to 3% of their Medicare payments based on their 3-year hospital readmission rates (CMS, 2020). Hospitals are thus encouraged to reduce readmissions by improving communication and coordination across the care continuum.

Problem Description

The healthcare organization selected for the project is a non-profit academic medical center located in urban Northern California. Readmission reduction is a strategic priority for the medical center to improve the efficiency of operations, ensure quality patient care, decrease cost, and avoid penalty. The analysis of organization-wide readmission data revealed an opportunity for readmission reduction in the HF population. The 30-day readmission rate reached 20% in 2019, the highest in 10 years at the medical center. Chart reviews were done on readmitted patients to understand the causes of rehospitalization. It was noted that the HF patients discharged to skilled nursing facilities (SNFs) and home health agencies (HHAs) were the most vulnerable cohort, with a high risk for rehospitalization as they were sicker with other co-

morbidities and had psychosocial challenges. In 2021, the readmission rate of HF patients discharged to SNFs and HHAs was 24%, higher than the institutional readmission rate of 16% for other patients with the same discharge disposition.

Setting

The medical center's cardiovascular service line serves around 5,000 patients annually. Of these patients, 17% are admitted with a primary diagnosis of HF. The volume of patients with HF has been increasing by 10% on average every year since 2017. The 30-day hospital readmission rate has also grown steadily at the medical center.

In 2012, the HF team worked on building relationships with local SNFs and HHAs to improve the management of HF patients. The primary interventions included creating community standards based on best practices, preparing a discharge referral packet, and sharing data regularly. The interventions reduced the 30-day readmission rate after one year of implementation. However, a drill-down of readmissions in 2019 revealed that the workflow had not been sustained over the years. Therefore, the safe transition of patients from hospitals to homes or post-acute care facilities was elevated as a topic of discussion for the cardiovascular service line and the medical center. No strategy for post-acute care collaboration was in place at the service line or the organization level. This project collaborated with local HHAs and SNFs that receive patients referred by the medical center. These agencies are independent and are not part of an integrated health system.

Specific Aim (Purpose)

The specific aim is to reduce the 30-day readmission rate for heart failure patients discharged to home health agencies and skilled nursing facilities by 20% by December 2022, four months after implementing the interventions.

Available Knowledge

PICO(T) Question

The following PICOT question guided the literature search: In heart failure patients (P), how does post-acute care collaboration for transitions of care (I) compared to no collaboration (C) affect the 30-day readmission rate (O) at the end of four months of implementing the intervention (T)?

Search Methodology

The Preferred Reporting Items guided the literature search for Systematic Reviews and Meta-Analyses (PRISMA) 2020 Statement (Page et al., 2021). A search of the PubMed and Cumulative Index to Nursing and Allied Health Literature (CINAHL) databases was performed with keywords and Boolean operator combinations *(heart failure) AND (post-acute care OR transitional care OR skilled nursing facility OR rehabilitation facility OR home health* agency) *AND (readmission) AND (care coordination OR collaboration OR interprofessional OR partnerships).* The search was limited to studies published in English between 2016 and 2022. Seventy-nine articles were returned, 34 from CINAHL and 45 from PubMed, of which seven were duplicates. A reverse search of references yielded four additional articles of potential interest.

The titles and abstracts of 76 studies were reviewed for relevance to the transition of care from hospital to post-acute care facilities. The 20 selected for full-text review addressed the continuum of care and had some degree of multidisciplinary collaboration, electronic health record operability, and interventions applicable to HF patients after discharge. Studies were subsequently excluded if they had interventions by a single discipline, did not involve hospitals, or were case studies or non-peer-reviewed periodicals. Fourteen studies were relevant to the

PICOT question and were selected for appraisal of evidence. See Appendix A for Literature Search Results and Selection Criteria (PRISMA Flow Chart). The Johns Hopkins Evidence-Based Practice Model for Nursing and Healthcare Professionals Appraisal Tools (Dang et al., 2022) was used to determine each study's level and quality of evidence. The studies comprised four Level III-A, four Level III-B, three Level I-A, two Level V-B, and one Level V-A studies. The evidence was summarized in an evaluation table adapted from Melnyk and Fineout-Overholt (2019). See Appendix B for the Evidence Evaluation Table.

Integrated Review of the Literature

There are few published studies on the collaboration between acute and post-acute care. The themes that emerged from the literature review were the multidisciplinary collaborative care model, post-discharge follow-ups, patient information flow, and integration with post-acute care (PAC) facilities.

Multidisciplinary Collaborative Care Model

In eight of the studies reviewed, collaboration among heart failure specialists, including advanced practice providers and registered nurses, primary care physicians, pharmacists, and case managers has been shown to reduce the 30-day HF readmission rate (Boykin et al., 2018; Driscoll et al., 2016; Hinch & Staffileno., 2021; Jepma et al., 2021; Naylor et al., 2018; Raat et al., 2021; Radhakrishnan et al., 2018; Summers & Atav, 2020).

Driscoll et al. (2016) conducted a Level III-B systematic review of 29 studies, including ten randomized control trials (RCTs), to study the systems of care for HF patients. The authors found that HF readmission and mortality rates decreased when the primary care physician (PCP) shared patient care with a cardiologist. The evidence could be used to design pre- and post-discharge interventions and develop partnerships with PCPs, cardiologists, and PAC facilities.

Boykin et al. (2018) conducted a level V-B quality improvement study that tested a collaborative care model with transition of care (TOC) pharmacists, HF advanced practice providers, and community paramedics. A team-based transition of care approach targeted patients within a 30-mile radius at high risk for readmissions. In addition to managing acute symptoms post-discharge, the team conducted home safety inspections, social support needs assessments, and laboratory tests. With the implementation of the collaborative care model, the 30-day readmission rate for HF patients was lowered to 10.5% during the initial seven months of intervention, as compared to 23.5% with usual care.

A quality improvement study, conducted by Hinch and Staffileno (2021) and rated Level V-B, tested HF transitional services between a hospital and four preferred home health agencies. The multidisciplinary team included a case manager, social worker, pharmacist, Bridge Program social worker, bedside nurse, HF nurse practitioner, HF cardiologist, primary care provider, dietician, and Preferred Provider Home Health nurse liaison. The post-implementation 30-day readmissions were reduced to 18.2%, exceeding the project goal of a 20% readmission rate.

Jepma et al. (2021) tested the effects of a nurse-coordinated "cardiac care bridge" transitional care program on cardiac patients 70 and older in a Level I-A RCT. The interventions did not impact the readmission rates. This study suggested that high-intensity interventions may not be appropriate for high-risk older patients, and they would benefit mainly from quality-of-life efforts in post-acute care. Additional studies are needed to elucidate age-specific disease management programs.

In a Level III A mixed-methods study, Naylor et al. (2018) explored common local adaptations of the Transitional Care Model (TCM) and examined the perceptions of the practitioners on the effectiveness of their organization’s transition care programs compared to

standard care. Based on an online survey distributed to 582 respondents, 10 TCM components were identified for adaptation at the local level. Two components addressed multidisciplinary collaboration: coordinating care among clinicians and sites and collaborating on the care plan with clinical teams, patients, and caregivers. Respondents who were part of integrated health systems reported fewer adaptations of TCM components than those in non-integrated settings. The perceived effectiveness of the adaptations was subjectively evaluated, imposing a limitation on the study.

Raat et al. (2021) performed a systematic review with meta-analysis that evaluated the effectiveness of different multidisciplinary HF disease management programs and PCP involvement in the transfer of care. The Level I-A study found the relative risk for readmission with multidisciplinary interventions was 0.76 (95% CI [0.62-0.93]) compared to usual care. The findings for PCPs' effectiveness in disease management programs were inconclusive due to the small number of RCTs focusing on primary care physicians.

Post-Discharge Follow-Ups

Evidence shows that follow-ups with the patient after discharge are essential to the continuum of care. A Level I-A systematic review and meta-analysis of 41 RCTs conducted by Vedel and Khanassov (2015) identified two critical transitional care interventions related to follow-up: "home visits by a home health nurse" and "frequency of monitoring." Home visit interventions with follow-ups such as telephone calls or clinic visits, prearranged in-person visits, telephone follow-ups, or video visits were high-intensity interventions that reduced the risk of readmissions by 8%. Only one means of follow-up, post-discharge phone calls, did not reduce readmissions (Vedel & Khanassov, 2015).

Radhakrishnan et al. (2018) used Coleman's Care Transitions Model to establish a continuum of care across hospitals and post-acute facilities by arranging home visits and three follow-up phone calls within 30 days. The case report, a Level V-B study, described a post-implementation HF readmission rate of 7.1%, but no pre-implementation readmission rate was provided for comparison. Most studies on this theme indicated the benefits of home health care (HHC) immediately after acute care discharge. However, a Level III-A retrospective cohort study (Weerahandi et al., 2020) reviewed the impact of HHC after skilled nursing facility discharge to home on Medicare beneficiaries. The readmission rate for patients with HHC post-SNF discharge was 22.8%, compared to 24.5% for those discharged home without HHC, indicating that the recipients of HHC after SNF discharge were less likely to be readmitted than those discharged without HHC. The study is limited due to its design, as it precludes causal inferences.

A descriptive study by Flanagan et al. (2018) explored the predictors of 30-day readmissions after discharge from SNF and found that patients with prior HF diagnosis have a three times higher chance of readmission within 30 days than other diagnoses. The level III-B study also noted that patients with "very high-risk" scores on the Braden Scale have a 20 times higher likelihood of readmissions attributed to malnutrition and poor mobility. Considering the chronicity of HF patients, assessment of malnutrition and mobility may be beneficial additions to transition of care interventions.

Patient Information Flow

Evidence from three studies showed that the flow of patient information between internal teams in the hospital and between care settings is critical for the effective transition of care (Adler-Milstein et al., 2021; Boykin et al., 2018; Samal et al., 2016). In the Boykin et al. (2018) study, the inpatient HF team used a referral system to initiate post-discharge communication with

the external multidisciplinary groups. The updates were shared through electronic health records between inpatient and outpatient HF clinics. The systematic review by Driscoll et al. (2016) noted that telemonitoring had mixed findings in improving outcomes, with a lower mortality rate for HF patients but no reduction in readmission rates. Radhakrishnan et al. (2018) conducted the TOC pilot program between a seven-hospital health system and a sizable post-acute care provider collaboration. The transitions coach maintained the database of HF patients enrolled in the program and facilitated frequent communications with both organizations' workgroups (Radhakrishnan et al., 2018). The systematic review and meta-analysis by Vedel and Khanassov (2015) recommended establishing post-discharge communication and improving the quality of information exchanged between the teams, for example, the quality of discharge summaries. Adler-Milstein et al. (2021), in their Level III-A national survey of SNF Nursing Directors, studied the quality of information shared by the hospitals when discharging patients to SNFs. Half of the respondents noted that almost 80% of information was missing when receiving patients at SNFs and reported spending an average of 6.5 hours per week communicating with the hospital to obtain information.

Integration with Post-Acute Care Facilities

Acute and post-acute care hospitals are accountable for readmissions under the CMS reimbursement models. The CMS programs such as HRRP and Skilled Nursing Facility Value-Based Purchasing (SNF VBP) have readmission incentives and penalties built into their Medicare reimbursement for hospitals (CMS, 2020) and SNFs (CMS, 2022). The hospital HRRP and SNF VBP programs place facilities at penalty risk for readmissions that exceed the risk-stratified national benchmarks. Readmission reduction efforts at the SNFs occur independently

of the medical system. Evidence suggests care delivery siloed between settings in this way contributes to poor outcomes and higher readmissions (Rahman et al., 2016).

A Level III-A correlational study by Gupta et al. (2019) examined the vertical integration between hospital-based SNFs (HBSNFs) and acute myocardial infarction, HF, and pneumonia readmission rates. In vertical integration, organizations offer distinct levels of care, services, or functions directly or through others. This national study found that HBSNFs had lower readmission rates from better integration of communication workflows and coordination among care providers. However, if an organization restricts patient discharges to its own SNF, it risks longer acute care stays due to limited capacity in meeting the demands of hospital discharges (Gupta et al., 2019). A Level III-B ex post facto design study by Summers and Atav (2020) included 94 hospitals in upstate New York to identify programs that contributed to reduced readmissions and penalties. Hospitals ranged from metropolitan to rural and excluded those in the New York City metropolis to ensure equitable representation. The study found that hospitals that collaborated with certified HHAs had lower readmission rates than hospitals that did not collaborate. Additionally, hospitals that utilized house calls and had higher numbers of HRRP initiatives received lower reimbursement penalties.

Summary/Synthesis of the Evidence

The multidisciplinary management of heart failure patients and high-impact transitional care interventions decrease HF 30-day readmissions. Evidence shows that when HF patients are recruited in the hospital for disease management programs, they have lower readmission rates and mortality rates than patients recruited from the community without hospital referral (Raat et al., 2021). Few studies involved PCPs, making the efficacy of PCPs in HF disease management inconclusive. However, the authors of the appraised studies strongly recommended that PCPs

continue to participate in disease management programs. Interventions such as home visits, follow-ups (telephone or clinic follow-up), and telecare provide a continuum of care. The literature review shows that bundling these interventions significantly impacts outcomes compared to their delivery in isolation.

A collaborative model that involved the HF team, PCP, and community partners that targeted post-discharge follow-ups with an HF clinic or PCP positively impacted outcomes. One of the systematic reviews found conflicting evidence on the efficacy of telemonitoring as a tool for HF readmission reduction (Driscoll et al., 2016). Further study is warranted to ascertain whether the shift in access to telemonitoring that accompanied the COVID-19 pandemic will improve access for HF patients.

In two Level III studies, Flanagan et al. (2018) with quality rating B and Weerahandi et al. (2020) with quality rating A, analyzed predictors for the 30-day readmission of SNF patients and the impact of home health services after SNF discharge. When home health services supported the next level of transition from SNF to home, readmissions decreased, but only 20% of SNF discharges received such services (Weerahandi et al., 2020). The Level III-A study by Naylor et al. (2018) found that the transition of care models with multiple components is usually adapted locally, with adaptations shaped by resources and motivations. Therefore, when applying evidence in the practice setting, adaptation knowledge is critical as there must be a balance between strict adherence to the components and the degree of adaptation so that the value of the intervention is maintained for an effective transition of care.

The evidence suggests that a strong integration between hospitals and post-acute care settings reduces readmission and improves patient outcomes. The advantage of vertically integrated health systems is that the services are coordinated and have better processes for

transition when governed by one organization. However, due to the Medicare prospective payment system, HBSNFs have decreased in the United States. Freestanding and HBSNFs are paid uniformly (Rahman et al., 2016). As the strategies for organizational structure evolve, the development of inter-organizational networks between hospitals, SNFs, and HHAs may work best from an operational standpoint. This project will use the best practices of a vertical integration approach to build the network with PACs and reduce readmissions collaboratively.

The studies in this review provided consistent evidence to support establishing a continuum of care with high-impact interventions when patients are discharged to home, home health agencies, and skilled nursing facilities to improve HF outcomes. Collaboration can bring synergy to independent practices for managing HF patient care, but it is not easily established in disconnected care systems. The evidence answers the PICOT question and warrants collaboration as a practice change for the transition of care for HF patients. Optimizing care systems at the macro level of hospitals and post-acute care facilities is the best way to ensure a continuum of care and reduce HF readmissions.

Rationale

Care coordination between healthcare systems based on a theoretical framework could minimize the fragmentation of care and improve outcomes for patients with chronic diseases. A comprehensive Coordination Network Multi-Level Framework (Gittell & Weiss, 2004) was selected for the DNP project. The framework comprises 11 key concepts exploring care coordination across organizations. Initially, Gittell (2000) created a relational coordination framework that included collaboration only within the organization. In 2004, Gittell and Weiss added the inter-organization domain to the framework and named it the Coordination Network Multi-Level Framework. See Appendix C for the Gittell and Weiss (2004) Coordination Network

Multi-Level Framework. Van Houdt et al. (2013) described the 11 key concepts of the Gittell and Weiss (2004) multi-level framework in detail and applied them to implement a care pathway involving hospitals and primary care providers. See Appendix D for the Van Houdt's Multi-Level Framework. This DNP project employed a care pathway approach described in Van Houdt's Multi-Level Framework for care coordination.

The care pathway concepts of a multi-level framework were used in the DNP project's assessment, planning, implementation, and evaluation phases. Evidence on basic structures needed in acute care and post-acute care settings to build a productive collaboration informed the assessment phase. The *need for coordination* drove leadership commitment and pushed the development of the *administrative operation process*. The project's scope was defined based on readiness assessment, knowledge, skill level, availability of resources, and technology. The evidence guided specific task characteristics such as dependencies and standardization during implementation. When there is minimal control over other organizations' behavior, developing clear task expectations between health systems has been beneficial in achieving desired outcomes.

Kotter's eight-step change management model guided key stakeholder teams through the change process (Kotter, 1996). The eight steps are: (1) increase urgency; (2) build guiding teams; (3) get the vision right: (4) communicate for buy-in; (5) enable action; (6) create short-term wins; (7) do not let up; and (8) make it stick. These steps are separated into three phases. The first phase creates *a climate for change*, comprising the initial three steps. The second phase engages and enables *the whole organization,* with steps four through six. The third phase is *implementing and sustaining the change,* with steps seven and eight (Kotter, 1996). The first phase of *creating the climate for change* was initiated in June 2021. Conversations with leadership were held in

July and August 2021 to discuss the issue and build urgency around PAC collaboration. During the same time, key stakeholders were identified to engage in this work. The second phase of *engaging and enabling the whole organization* was initiated in October 2021 with buy-in from key stakeholders. The third phase started in September 2022, when the pathway was implemented.

Methods

Context

The number of HF patients treated in the academic medical center has increased by approximately 10% yearly since 2017. In the decade between 2012 and 2022, the HF team did considerable work to manage the care of the growing HF population, but readmission rates continued to be challenging. The providers have built a clinical pathway to ensure that HF patients are assessed and placed on guideline-directed medical therapies (GDMTs) recommended by the American Heart Association and American College of Cardiology. The program also has support from a transition of care (TOC) pharmacist who does medication reconciliation at admission and medication teaching at discharge. Despite continued efforts, steadily increasing HF readmission rates negatively impact the organization's efficiency, while the penalties CMS can impose have serious financial implications. As reducing HF patient readmissions is one of the strategic priorities, this quality improvement project aligns with organizational and service line goals. The senior leaders of Quality, Cardiovascular Service Line, and Care Coordination have approved the project. See Appendix E for the Letter of Support.

The project initiated collaboration between the medical center's heart failure team and local SNFs and HHAs. The interventions focused on patients with a primary diagnosis of HF discharged to the selected SNFs and HHAs. The fiscal year (FY) 2020 HF discharge dispositions were reviewed to identify various SNFs and HHAs for which HF patients are referred post-discharge. The top 14 SNFs and HHAs were selected as the partner PACs for the project based on the referral volume and an existing HF program. The readmission rates of patients discharged to the selected facilities and quality star ratings from the CMS website were also obtained for baseline data. The DNP student, who is the Quality Director of Cardiovascular Health, led the

project and created the HF transitions task force with representatives from the project's key stakeholder group. The task force was comprised of the Director of Cardiovascular Health Clinical Operations, Manager of the HF Clinic, HF Advanced Practice Provider, HF Clinical Nurse Specialist, Executive Director of Clinical Support Services, Manager of Care Coordination, Inpatient Nursing Manager, Quality Consultant, and Medical and Nursing Directors of SNFs and HHAs. The Director and Managers of Clinical Operations and Nursing were decision-makers on resource allocation to the project and workflow changes. The Care Coordination team had developed working relationships with many of the PACs in the area. Thus, they were instrumental in scheduling initial interviews with PACs, discussing existing barriers, and developing the pathway. The project lead and the Quality Consultant ensured the project stayed on track, provided support with data abstraction analysis, and guided the interventions based on evidence.

Interventions

The primary intervention of the DNP project was the implementation of an evidence-based inter-organization HF care pathway. See Appendix F for the HF Continuum of Care Pathway. A task force consisting of multidisciplinary stakeholders from the medical center and the PACs was formed to develop the pathway. The pathway was based on the Multi-Level theoretical framework described by Van Houdt et al. (2013) to ensure an inter-organization care coordination network is established through this collaboration. New workflows were developed based on intra and inter-organizational leadership support, resources, and an aligned need for coordination. The workflows were organized into a multimodal pathway with six key interventions: identification of HF patients during transition, optimization of discharge handoffs,

post-discharge follow-up, information sharing, inter-organization feedback, and nursing learning assessment and education during transitions of care.

Identification of Heart Failure Patients

During the planning and analysis phase, it was discovered that the partner PACs had difficulty identifying HF patients from the long problem list documented in the electronic health record during discharge. Handoffs were generic without specific information regarding the patient's HF treatment during the admission, delaying initiation of an HF care plan at the receiving facility and placing patients at elevated risk of adverse outcomes. The HF task force worked with the key stakeholders and IT team to create HF banners for the Interagency form and Fax Referral forms to identify HF patients readily.

Optimizing Handoff Process

Discharge handoff was another key element of the pathway. The Case Management and Nursing handoff workflows did not include HF-specific monitoring and follow-ups. For SNF discharges, Case Management Referral and Interagency Form were updated to include information on daily weight monitoring, low sodium diet, upcoming cardiology appointment, and the need for video visits or transportation for the follow-up appointment. For HH discharges, the referral requested an initial home visit by a registered nurse (RN). The HF task force agreed that an initial assessment by the home health RN would ensure appropriate clinical assessment, medication reconciliation, and escalation of symptoms to the provider promptly. In 2021, the Cardiology unit established four HF nurse champions to support the nursing management of HF patients. The HF task force partnered with the HF champions to standardize the nursing handoff process and utilize Interagency Form to share specific HF-related information with the SNF.

Optimizing Post-Discharge Follow-Ups

The medical center optimized the post-discharge follow-up of HF patients by implementing a process to make phone calls within 48 hours of discharge and follow-up appointments with the HF provider within seven days of discharge. Evidence indicates that these additional contacts helped providers assess the patient's condition, their understanding of discharge instructions, and the potential for medication adherence. The pathway allowed timely updates on patient status, weight, mobility, and an opportunity to resolve medication issues. During each call, the medical center's HF RN Coordinator reviewed the patient's status, responded to questions, and facilitated any orders needed from the HF team. Additionally, the HF CNS team worked with the medical center's Cardiology Clinic leaders to open some slots for seven-day follow-up discharge appointments.

Information Sharing Tools

Evidence from the literature suggests that good information-sharing practices are a critical component of bundled interventions that reduce the rate of 30-day readmissions. The current state analysis identified inconsistent communication channels between the medical center and the PACs to discuss logistic barriers in either initiating care or executing follow-up plans. The project lead consulted the medical center's Associate Chief Medical Informatics Officer, who recommended trialing a feature in the current health information exchange called Physician Referral Information at Stanford Medicine (PRISM). The HF task force asked the PRISM team to demonstrate how PACs could view the medical center's encounter data and communicate bi-directionally with the medical center's provider. During the demonstration, the project team learned that PAC medical providers could request PRISM access and view a discharged patient's information. However, PACs could not message back to the medical center. PACs with access to

PRISM could only send patient data as an attachment to the medical center. The HF task force and the PRISM IT team worked together to launch an innovative intervention called *Prism Heart Failure Nurses* messaging pool. The messaging pool was piloted with one of the HHAs and later rolled out to other PACs. The task force assisted the PAC Medical Director in obtaining access to the PRISM portal using their National Provider Identifier number and assigning a proxy to other members who needed to review patients' medical records. Guidelines were created to ensure the messaging pool is used only for non-urgent HF-related queries and updates, not for clinical questions and orders. The communication channel for urgent clinical questions continued to be the phone call to the medical center's on-call provider.

Inter-Organization Feedback

The HF Continuum of Care pathway went live in September 2022. The medical center's HF team met biweekly with the partner PACs to review transition workflow, patient progress, readmission, and discharge disposition information. The Quality team identified patients referred to the partner PACs five days before the scheduled check-in. The list of patients was securely shared ahead of time with the respective PAC partner for review. A check-in template was used to ensure consistent discussion across the PACs and monitoring of process measures. See Appendix G for CVH-Heart Failure Post-Acute Care Provider Agenda Template.

Nursing Learning Assessment and Education

Nurses play a critical role in preparing patients for discharge to the next care setting. Evidence suggests that a standardized discharge protocol deployed during transitions of care can reduce readmissions. A pre- and post-learning assessment was administered to establish baseline knowledge and optimize nursing discharge protocol. The assessment consisted of eight multiple-choice and two qualitative questions to assess the cardiology unit RN’s knowledge of HF

patients' discharge preparation and current multidisciplinary resources. See Appendix H for the Heart Failure Transition of Care Knowledge Assessment tool. A total of 41 responses were received for the pre-intervention survey and 22 for the post-intervention survey. The HF task force worked with the HF Champions and Unit Educator to review the results and identify key areas of education needed to prepare patients for the next level of care. A PowerPoint presentation was developed to address the importance of transitions of care, preparing HF patients days before discharge, and addressing expectations on the day of discharge. Three education sessions were conducted through virtual staff meetings. Additionally, a one-page tip sheet was created to display in the unit for quick reference and ongoing education. See Appendix I for the Nurse Transition of Care Tip Sheet.

Gap Analysis

In the planning stage of the project, key stakeholders were interviewed to understand the current state of the HF transition process and identify gaps. See Appendix J for the Current State Workflow. The gaps were assessed in both inter- and intra-organizational design and networks. It was noted that there was no formal collaboration with the post-acute care facilities and no common approach toward readmission reduction. The responsibilities for care transition were unclear at the medical center and the PAC facilities. Additionally, the care coordination department had a high attrition rate, which contributed to inconsistent care coordination support to service lines. During a high census, the care coordination team is mobilized to support the organization's areas of highest need, leading to delays in discharge planning and ineffective handoff to the PAC facilities.

Another gap was the lack of interoperability of electronic health records between the organizations, which led to challenges with information sharing. To initiate an HF care plan, the

PAC facilities must be able to identify patients discharged with an HF diagnosis. The discharge summaries included HF in the problem list with all other conditions, making it difficult for the PACs to identify an HF patient. Additionally, patient and family member involvement are critical for discharge planning and follow-up. However, patients often missed their follow-up appointments and phone calls, attributed partially to a lack of engagement, and often delayed establishing home health services after discharge from the hospital. The readmission case reviews indicated that psychosocial issues, non-adherence to diet, lack of exercise, and poor fluid management regimens were additional reasons for HF readmissions. See Appendix K for the Gap Analysis.

Gantt Chart

The Gantt chart is a working document designed to visualize the tasks and timelines for the project. The chart timeline helped the project lead, HF task force, and other stakeholders understand the project's progression from planning, design, implementation, and outcome evaluation. The planning phase involved collecting baseline data, creating the HF task force, and getting approvals from key stakeholders. The HF task force designed the pathway and associated interventions during the implementation phase. The Gantt chart helped identify task dependencies to move the project efficiently. The data-monitoring system created during the project helped to evaluate process and outcome measures and was discussed during the HF task force and bi-weekly check-in meetings. See Appendix L for the Gantt Chart.

Work Breakdown Structure

The Work Breakdown Structure tool divides the project into components with a process-centered methodology. The specific details help define the scope and identify checkpoints, deliverables, cost, and timeline-dependent sequence of events. The DNP project design has six

sub-levels, starting with planning and finishing with evaluating. The planning phase comprised developing the project plan, creating the charter, collecting data, interviewing key stakeholders, and getting approval from the leadership. The external stakeholder assessment phase included tasks related to assessing external stakeholders' commitment to the mutual goals. During this phase, the HF task force started developing the pathway. The budget phase addressed staffing needs and estimated training and program costs. The education phase covered developing education materials and conducting training sessions. The implementation phase had two steps, deployment of care pathway interventions and formal biweekly check-ins to monitor adherence to the pathway. Finally, the evaluation phase consisted of monitoring outcomes, modifying workflows based on lessons learned, and rolling out best practices to other areas. See Appendix M for the Work Breakdown Structure.

Responsibility/Communication Plan

The DNP student was the team lead for this project and oversaw task accountability and deliverables. Communication with the sponsors and key stakeholders was through scheduled meetings and emails. The HF task force met biweekly to finalize the components of the care pathway. After the pathway's launch, the task force met monthly to review the progress and barrier. The pathway updates were presented monthly to the Quality Management Guidance Team and bimonthly at the HF Clinical Effectiveness Council. See Appendix N for the Communication Matrix.

SWOT Analysis

The SWOT (Strengths, Weaknesses, Opportunities, and Threats) analysis strategically assessed the project’s internal and external factors with potential impact on the organization in the short-term and long term. The strengths of this project were that the organization is a well-

positioned provider in the market and experiences a yearly increase in heart failure patient volume. Other factors strengthening this project were leadership readiness and buy-in, a skilled HF team, and an organizational culture that supports innovative quality improvement projects. The readmission reduction efforts were anticipated to reduce episode costs for Medicare patients, improve capacity restraints, and provide timely services to other patients in need. The partnership with PAC facilities was anticipated to improve the continuum of care for HF patients and the management of HF patients in their communities. The weaknesses were high readmission rates of HF patients discharged to PACs, lack of awareness of post-discharge workflows, lack of data availability on discharge dispositions, and resource constraints with care coordination teams supporting post-discharge workflows. Opportunities were avoiding CMS penalties for hospitals and the PAC partners, improving the organization's reputation, and better working relationships with PAC facilities within a preferred partnership model. COVID-19 pandemic surges posed a threat to the DNP project. During two COVID-19 surges, the demand for skilled nursing services spiked, reducing bed availability for acute care referrals. Staff resources were strained at the medical center and PAC facilities, which delayed the project. A threat to the project's sustainability is the PACs' independent status, such that the medical center has no control over the post-acute interventions. See Appendix O for the SWOT Analysis.

Comprehensive Financial Analysis

The in-kind labor costs for the HF task force accounted for 99.7% of the $59,000 budget to implement the HF Continuum of Care pathway. The planning and implementation of the project happened during the COVID-19 pandemic, and meetings were made virtual to the maximum extent. There were no expenses related to supplies, training materials, and transportation. Meals accounted for the remaining 0.3% of the budget at $120. The DNP project's

nursing knowledge assessment and education components were conducted in multiple staff meetings (for approximately six hours) at no cost to the project. See Appendix P for the Budget.

The budget for the implementation year is high compared to the subsequent years due to the meetings associated with the development and launch of the pathway. The budget feasibility of the project in Year 2 and Year 3 will have substantially lower program costs, as the pathway education would be needed for only new hires in the Cardiology Nursing units, Care Coordination team, and HF team, and quarterly check-ins with the PAC partner.

Considering the recent growth of the HF program, the operation team has added responsibilities to the roles of HF Nurse Coordinator and Advanced Practice Provider. The Nurse Coordinator and Advanced Practice Provider support the HF transition work as part of their roles. The additional responsibilities do not add any costs to the project. Under the new HF Continuum of Care pathway, the existing outpatient social worker assists complex HF patients and coordinates efforts with the inpatient care coordination team. This care coordination is accommodated by the current structure of the clinic at no additional cost to the project.

The cost-benefit analysis is calculated based on reducing avoidable admissions, improving acute bed access for Cardiovascular Health (CVH) patients, and mitigating readmission penalties. The volume analysis revealed that referrals to the 14 partner PACs are projected to increase by 22% from baseline (fiscal year 2021) to post-implementation 2022-23. Financial analysis of the HF population in the literature estimates an average cost for HF readmission of $15,732 (Patel, 2021). In the four-month implementation period, the DNP project experienced a 20% reduction in readmission from the select PACs (n=3). Assuming a 20% reduction is stable, the approximate cost avoidance is projected to be $47,200 over four months and $188,784 annually. Considering the project cost is approximately $59,000, the cost-benefit

ratio is 2:1. This ratio indicates that project costs will be recovered in Year 1 of the implementation. See Appendix Q for the Cost-Benefit Analysis.

The average baseline length of stay (LOS) for HF patients in the medical center is seven days. Three readmissions were avoided during the four-month pathway implementation, which is equivalent to 21 bed days saved in four months and 84 bed days saved annually. These bed days could then be used for other CVH patients, generating revenue for the organization. While the medical center had not received any HRRP penalties for HF readmissions in the past ten years, the risk of exceeding the cutoff rate was always high. Should a penalty of even 1% be imposed due to high readmissions, the cost to the medical center would be approximately $3 million. Therefore, the medical center must keep the readmission rate below the national benchmark to avoid an HRRP penalty.

Study of the Interventions

Readmission reduction is a strategic priority for the organization and the CVH service line. The analysis of the medical center's HF readmission data showed that the patients discharged to SNFs and HHAs were the most vulnerable cohort, with a high risk for rehospitalization. They were sicker with co-morbidities, and many had psychosocial challenges. Readmission data and an analysis of the current transition to post-acute care indicated the need for quality improvement measures for patients discharged to PACs. Evidence from the literature also supported integration with PACs to build a multidisciplinary collaborative care model that would support the transition of care and reduce readmissions.

The impact of the interventions was assessed using pre- and post-implementation data for the selected 14 partner PACs. The HF dashboard was used to abstract HF patient details, including demographics, length of stay, readmissions, discharge disposition, diagnosis related

groups (DRG) and process measures such as compliance with follow-up phone calls, discharge appointments, teach-back, and medication teaching at discharge. The primary heart failure patients were identified by the heart failure DRGs that is currently used in HRRP program. Run charts were used to monitor monthly readmission rates and analyze common and special cause variations.

Outcome Measures

The outcome measure for the project is 30-day all-cause readmissions of patients with a primary diagnosis of HF discharged to the partner PACs. The anticipated outcome was a reduction in readmissions as HF patients would be well-supported during the continuum of care. The 30-day all-cause readmission rate was considered the best indicator of an inter-organization collaboration.

The HF dashboard data was used to identify the HF cohort and their discharge disposition. Any missing data were manually abstracted. The readmission data was expressed as a monthly percentage of patients returning to the medical center within 30 days of discharge to the PACs. The index hospital LOS was the balancing measure to study because a longer LOS reduces the readmission rate. Five process measures were chosen to assess the impact of the pathway: (a) rate of post-discharge follow-up phone calls within 48 hours of discharge; (b) rate of post-discharge appointments within seven days of discharge; (c) rate of home health (HH) nurse initiating care with the patient within 48 hours; (d) rate of SNF HF patients discharged to HH services; (e) transition of care knowledge assessment of cardiology unit nurses.

The post-discharge follow-up measures were chosen as they are included in the Agency for Healthcare Research and Quality best practices for readmission reduction (Jack et al., 2013). The review of the evidence for this project also indicated that these are high-impact interventions

to reduce readmissions. The timely initiation of HH services after discharge supports patients' transition to home. Initiating HH services within 48 hours of the patient's return home is required by the Condition of Participation for Title 42 (Electronic Code of Federal Regulations, 2021). Currently, the medical center has no visibility on this measure. Thus, the rate of HH referrals initiated within 48 hours was selected as one of the process measures. Evidence suggests that if patients receive HH services upon SNF discharge, there is a lower risk of readmission. SNF leadership acknowledged this as a best practice to reduce readmissions and agreed to measure the rate of SNF HF patients discharged with HH services. As these two measures are external to the medical center, no baseline data exists for comparison to post-intervention outcomes. However, these process measures will build data for future interventions.

The outcome and process measures were discussed during biweekly check-ins to assess the effectiveness of the implementation. Inter-organization feedback through check-ins was a new intervention for the medical center and the partner PACs. Post-implementation, the medical center and PACs continued coordinating readmission-reduction efforts by aligning organizational goals and supporting the pathway.

CQI Method and Data Collection Tools

This project followed the Lean methodology adopted by the medical center for quality improvement initiatives. Lean methodology has two main components: improvement and management systems. The improvement system includes process improvement concepts, methods, and tools. The management system creates the environment to support and sustain the improvement activities. See Appendix R for the CQI Method - Lean Methodology Diagram.

The HF data resides in a dashboard explicitly created to monitor HF readmissions. The patient-level variables available for analysis are (a) the number of admissions; (b) the number of

readmissions; (c) length of stay; (d) follow-up phone call; (e) discharge disposition type; and (f) location. The patient-level data were exported from the HF dashboard into an Excel spreadsheet. A manual chart review was performed to fill in missing data. During biweekly check-ins, the HHAs provided data on whether the patient was seen by home health nurse within 48 hours of discharge, and SNFs provided data on the number of patients who received home health referrals on discharge. An electronic questionnaire was used to administer the pre- and post-intervention knowledge assessment survey. See Appendix S for the Data Collection Tools.

Analysis

The quantitative data were extracted from the electronic health record and stored in an Excel spreadsheet. Excel analytics were used to format and organize the data for the partner PACs and study the variables at different phases of the project: baseline, implementation, and post-implementation. The pivot function was used to slice data per discharge disposition. Descriptive statistics were used to describe the outcomes, consisting of percentages, means, standard deviations, and t-tests. Stata version 14.2 was used to study the correlation between the outcome and process measures. The nursing TOC knowledge assessment questionnaire for the RNs was built on Microsoft Forms and accessed via a QR Code. The responses were exported to Microsoft Excel for pre- and post-analysis. Each survey response was scored, and each question's average score was calculated. The pre-and post-education survey results were then analyzed using an unequal variance t-test. Additionally, the eight multiple-choice questions pre- and post-education scores were compared to evaluate the improvement.

Ethical Considerations

Considerable attention has been given to HF care management, as the care for a single episode of illness is fragmented across multiple sites. When patients are readmitted, it is easy for

the sites to blame each other for ineffective transitions or sub-optimal care. Additionally, “gaming the system” to reduce readmissions may be an unintended consequence of financial incentives and disincentives. For example, patients and families could be discouraged from seeking hospital or ED care, or nursing facilities could choose to accept only referrals that are low risk for readmission. While each entity has its business interests, it is critical that the guiding principles of healthcare not be compromised. The alignment of business interests and ethical care requires the active involvement of providers with patients and their families, quality outcomes reporting, and regulatory oversight across the continuum of care.

Provision 8 of the American Nurses Association (ANA) Code of Ethics supports the project to collaborate with other health professionals and the public to protect human rights, promote health diplomacy, and reduce health disparities (ANA, 2015). When redesigning systems of care, nursing can enhance collaboration among different health teams at intra- and inter-organization levels. A study conducted by the CMS Office of Minority Health (2020) to assess the impact of hospital readmission reduction initiatives on vulnerable populations found that race and ethnicity, Medicare-Medicaid dual eligibility, and potentially disabling conditions were disproportionally associated with 30-day readmissions of Medicare fee-for-service beneficiaries. Chronic clinical conditions have social justice implications for individuals who have little or no access to healthcare, or whose medical needs are beyond their ability to pay (Wakefield et al., 2021). Provision 9 of the ANA Code of Ethics (ANA, 2015) obligates nurses to integrate principles of social justice into nursing and health policy in a concerted effort to match the discharge setting to the patient's needs, which may reduce both readmissions and healthcare disparities.

The COVID-19 Outbreak Public Evaluation Survey conducted by the Centers for Disease Control and Prevention in June 2020, indicated that 41% of adults delayed or avoided any medical care, including urgent or emergency care, because of COVID-19 (Czeisler et al., 2020). Delayed or interrupted care is a concern for patients with chronic conditions, including HF. These individuals may arrive at the hospital sicker, take longer to recover, need more support upon discharge, and are more likely to require rehospitalization.

The project aligned with the Jesuit value of *cura personalis,* or care of the whole person, with individualized attention given to a person's needs in consideration of unique circumstances and challenges (University of San Francisco, n.d.). Readmission reduction initiatives are directed toward identifying appropriate patient resources and having them ready at the time of discharge from the hospital. This DNP project aims to meet patient needs by ensuring arrangements are made to support continuity of care.

The University of San Francisco School of Nursing and Health Professions has determined that this project meets the guidelines for a non-research, evidence-based change in a practice project. As non-research, the DNP project does not require review by the academic medical center’s Institutional Review Board. There were no identifiable issues or conflicts of interest for this project. See Appendix T for the Statement of Non-Research Determination.

Results

The project implementation phase began in October 2021, with the pathway projected to launch within nine months. However, the COVID-19 winter surge in December 2021 and work stoppage in April 2022 at the medical center delayed the launch for three months. During these two events, leaders participating in this project were redirected to support hospital operations. In September 2022, the pathway went live with biweekly check-ins. From mid-September to end of October 2022, the medical center experienced a record-high census. Heart failure patients were taken care of by surge teams, who were temporarily put together to manage the high influx of patients. The arrangement might have impacted the optimal use of HF disease management protocols.

The baseline data analysis for FY 2021 revealed that HF patients were referred to 96 different PACs. From the total, 14 PACs (eight HHAs and six SNFs) were selected for the project based on the highest referral volume and the HF program at their facilities. In the baseline patient cohort, 72% of referrals went to HHAs, and 28% to SNFs. In the post-implementation cohort, 82% of referrals went to HHAs and 18% to SNFs, a 13.9% percentage point increase in referrals to HHAs.

The mean age of the baseline cohort was 75.8 years, and the mean age of the post-implementation cohort was 78.9 years. The age difference between the baseline and post-implementation cohorts was nonsignificant ($p = .141$). In the baseline cohort, 61% were male, compared to 55% in the post-implementation cohort. The percentage of patients with the principal diagnosis of I13.2- *Hypertensive heart and chronic kidney disease with heart failure and stage 5 chronic kidney/ESRD*, increased from 9% in the baseline cohort to 18% in the post-implementation cohort, indicating higher comorbidity.

The 30-day all-cause readmission rate of the post-implementation cohort was 20% compared to 25% for the baseline cohort, a 20% reduction from baseline (p = .466). The result was interpreted to be clinically significant, as project interventions provided continued patient support after discharge and reduced rehospitalization. The high census in the medical center and limited bed capacity of the PACs to take patients from the medical center might have led to the increase in the average LOS of HF patients in the post-implementation phase from seven days to nine days (p=.034). The high census in the medical center, capacity challenges at the partner PACs, and factors such as social isolation (defined as living alone and homelessness) may have impacted the project outcome and process measures. The results of the five process measures are discussed in detail below.

Follow-up Phone Calls Within 48 Hours of Discharge

The completion rate of follow-up phone calls within 48 hours of discharge increased from 90% at baseline to 96% post-intervention (p= .208). The improved completion rate reflected an increased post-intervention understanding of discharge instructions by patients and caregivers.

Follow-up Discharge Appointments Within Seven Days

The rate of follow-up discharge appointments within seven days decreased from 68% to 58%. Analysis of the post-intervention cohort revealed that while a few patients missed the seven-day appointment cutoff for the measure, 72% were still seen within ten days of discharge, maintaining the provider connection after transfer to a PAC. The HF team will continue monitor this element to improve the process to ensure patients receive timely post-discharge appointments.

Home Health Enrollment Within 48 Hours of Discharge

Care was initiated within 48 hours in 46% of discharges to HHAs. Several barriers to prompt initiation of care were identified, including patient declining HHA enrollment after discharge to home, HHAs waiting for insurance authorization, and the HHA's inability to reach the patient. As this process measure was identified during project planning, no baseline data were available for comparison. The measure brought visibility to the HF task force on barriers to initiating home health services after discharge and prompted discussions on mitigating them.

Referral to Home Health Services When Discharged from SNFs

Approximately 56% of patients discharged from SNFs received referrals to home health services. Referral to home health services upon discharge from a SNF was also a new process measure identified during project planning. No baseline data were available for post-intervention comparison. As patient referral by SNFs to home health services is recognized in the literature as a best practice, the medical center will continue obtaining this data to study the impact of home health services referral on hospital readmission. See Appendix S Data Collection Tools for detailed information.

Transition of Care Knowledge Assessment of Cardiology Unit Nurses

The pre- and post-education results of the cardiology nurse transition of care (TOC) knowledge assessment were compared to evaluate the impact of the education intervention. The HF Transition survey scores showed a 4.5% improvement in the post-education cohort (mean 84.4%) compared to the pre-education (mean 80.8%) with p=.578 (unequal variance t-test). Eight multiple-choice questions were analyzed for changes in the highest possible rating option, i.e., top box scores. Approximately 90% of the nurses in the pre- and post-education

surveys responded that it is *extremely important* for the RNs to know about interventions that ensure continuity of care for HF patients after discharge. Before the education intervention, only 44% of the RNs reported being *very familiar* with their care transition responsibilities for HF patients discharged to post-acute care facilities. Post-education, 82% reported being *very familiar* with these responsibilities. While a discharge plan is a critical component of care transitions, only 29% of respondents to the pre-education survey indicated that they were *always aware* of the discharge care plan. Post-education responses increased to 41%, indicative of a persistent gap in interdisciplinary communication. In the pre-education assessment, 32% of RNs responded that they *always liaised* with a case manager and social worker to address post-discharge barriers. Post-education, the *always liaise* response rose to 50%. In the pre-education assessment, 71% of RNs *strongly agreed* that effective care transitions would improve the quality outcomes such as readmissions and length of stay. The post-education finding was that 64% of respondents *strongly agreed,* suggesting the RNs may have gained a better understanding of the complexities of the HF continuum of care during the training.

Before the education intervention, 2% of the RNs *strongly agreed* that HF patients understood what to do if problems arose after discharge, which remained consistent in the post-education survey. The *strongly agree* response rose to 5% and the *agree* response rose from 46% to 59%, suggesting that while RNs are not fully confident HF patients know what to do if problems arise after discharge, they believe patients are becoming more knowledgeable. Prior to the education intervention, 22% of the RNs *strongly agreed,* and 59% *agreed* that the discharge planning activities currently in place (e.g., PT/OT evaluation, CNS consult, dietary consult, patient education, medication reconciliation, case management) provided effective

transition of care for HF patients at discharge. Post-education, the *strongly agree* response decreased to 18%, but the *agree* responses increased to 73%, suggesting the RNs perceive the TOC services provided by other ancillary teams are effective. In the pre-education survey, 49% of the respondents were *fully confident* about what to include in the verbal and written handoff to the post-acute care setting. Post-education, 77% of responding RNs reported being *fully confident* about what to include in the handoff to the post-acute care setting. See Appendix S Data Collection Tools for detailed information.

Two existing measures the HF program uses for active daily management provided insight into the pathway implementation: teach-back and medication teaching at discharge. During patient admission, the HF Clinical Nurse Specialist completes patient education, verifies understanding with teach-back, and documents this in the electronic medical record. Similarly, pharmacists complete the medication teaching at discharge to ensure the patient understands the medication and how to take it. The HF education teach-back measure improved from 85% at baseline to 94% post-implementation. Similarly, medication teaching at discharge also improved from 54% at baseline to 72% post-implementation. Both outcomes are unanticipated benefits of the pathway implementation.

Discussion

Summary

The project aimed to evaluate the impact of post-acute care collaboration on reducing the 30-day readmission rate for heart failure patients. In this quality improvement project, implementing the HF Continuum of Care Pathway in collaboration with HHA and SNF leaders reduced 30-day readmissions. Although the change in the post-implementation 30-day readmission rate was not statistically significant, the pathway closed consequential gaps in transitions from acute to post-acute care by establishing bidirectional communication and evidence-based TOC best practices. The process measures used to assess the impact of the pathway improved from baseline, indicating the outcomes were due to pathway implementation. Although the process measure of follow-up appointments within seven days decreased by 15% from baseline, 72% of patients were seen within ten days of discharge, indicating patients had the opportunity to connect with a provider after discharge. The HF task force will continue to iterate the workflows to ensure patients are seen in the clinic within seven days. The project outcome benefitted from the strength of the existing HF program and leadership's commitment to expanding and improving the post-acute care network management.

The HF task force learned how widely the knowledge and skills of care team members varied at the PACs. The task force also recognized the need for PACs to have a HF program and consistent staff education to engage effectively in an inter-organization care pathway. The HF Continuum of Care pathway was developed and implemented during the COVID-19 pandemic, which impeded conducting in-person meetings and on-site visits. The need for close in-person collaboration of leaders from the different organizations at early planning stages and

on-site visits to understand and develop the workflows became apparent as the multi-organization pathway took shape.

The project tested a new concept of using an electronic health record messaging system for bi-directional communication with the PACs. Although effective for the pilot PACs, the system-wide spread would require more resources to manage the messaging system. To achieve a sustainable workflow on a larger scale, the HF team, working with the care coordination and medical informatics teams, would need to carefully evaluate resource requirements, calculate the return on investment, and secure organization-wide support for the messaging system.

The project has several implications for advanced nursing practice. Implementing a disease-specific pathway requires support from multiple teams, both internal and external, to the organization. Key executive decision-makers such as the Director of Case Management, Director of Nursing in PACs, Executive and Administrative Director of Cardiovascular Health, Vice President, and Director of Quality are all nurses with advanced degrees in nursing. This project underscored how nurse leaders can influence and shape healthcare practices. Alongside executive leaders, the nurse advanced practice providers are improving the clinical management of HF patients in both inpatient and ambulatory areas and are ensuring patients' smooth transition of care. Additionally, nurse case managers are key players in identifying patients at risk for poor transitions and matching their needs to an appropriate discharge setting. Standards of practice in TOC are constantly evolving as health policies change, resources shift, and new modes of communication are adopted. Nurses are part of the core multidisciplinary team that ensures knowledge development in TOC and assists with adapting evidence-based practices to systems and settings.

The literature on HF shows significant health disparities among individuals with this chronic condition. The ability to perform a regular job and remain employed is jeopardized as HF progresses. *The Future of Nursing 2020-2030* report published by the National Academies of Sciences, Engineering, and Medicine (2021) describes the social implications of chronic conditions, including disability, financial poverty, and living in areas with inadequate access to healthcare (2021). The report also emphasizes nurses' ethical obligation to act to bring principles of social justice into nursing practice and health policy. In the last decade, nurses have significantly reduced HF readmissions and mortality and improved care transitions. When involved in redesigning systems of care, nursing can enhance collaboration across different health teams and organizations to promote health equity.

Interpretation

The HF Continuum of Care Pathway incorporated evidence-based practices to optimize patient transitions from acute to post-acute care. Evidence suggests that bundling follow-up interventions (i.e., home visits, telephone or clinic follow-up, and televisits) improves TOC outcomes over interventions delivered individually. The project outcome of lower 30-day readmissions may be attributed to bundled follow-up interventions, formalized care team roles and responsibilities, improved communication and information transfer, better post-acute care network management, and combinations thereof. Considering the chronicity of HF, a condition that worsens over time, many confounding factors may influence treatment outcomes. Therefore, it is difficult to tease out relationships between specific improvements introduced by the pathway and short-term health outcomes of a patient cohort, as measured by 30-day readmissions for patients in the partner PACs. Social determinants of health can substantially influence health outcomes as vulnerable patients, including those with dementia,

depression, homelessness, or drug use, are at the highest risk for medication non-adherence (Maddox et al., 2021). The medical center has workflows to assess high-risk HF patients and connect them to appropriate community resources upon discharge. However, acute and post-acute care facilities cannot comprehensively manage patients' psychosocial issues.

The findings of this test of change support a multi-level theoretical framework where the organizations must assess the intra- and inter-organization infrastructure and implement networks to build collaboration. For the successful spread of interventions to other PACs, care coordination goals must be aligned between acute care and post-acute care facilities. Internal medical center data shows that referrals to PACs are increasing every year. Thus, staff may need further education on preparing patients and caregivers for discharge to better prepare them for the transition. Additionally, high-risk patients may benefit from provider-to-provider warm handoffs during the transition. This intervention warrants further exploration for its benefit in reducing information delays, adverse events, and patient dissatisfaction.

Readmission reduction is a strategic priority for the medical center. The favorable outcome of the DNP project has positively impacted medical center efficiency and improved the quality of care for HF patients. The main cost of implementing the project was for the salaries of the HF task force members who designed the pathway and piloted it with the PACs. No opportunity costs or strategic trade-offs were identified for this project. Analysis of the outcomes indicates that standardizing communication and expectations with PACs can build inter-organization collaboration and a post-acute care network in the long run. Based on the project findings, there is a high possibility that establishing a pathway between acute care and post-acute care facilities will become an essential component of the 30-day readmission reduction strategy.

Limitations

As this was a single-site quality improvement project piloted in collaboration with 14 PACS, the results may have limited generalizability to other inter-organization systems and settings. The high HF patient census at the academic medical center motivated leadership in developing strategies to improve patient flow, one of which was to create contractual agreements with some of the post-acute care facilities. Entering a contract may influence collaboration and 30-day readmissions, as contracted PACs will be obligated to perform care coordination ta as compared to PACs without a contract.

The incompatibility of technology applications between the medical center and the PACs impeded information sharing and left the intervention's full potential unrealized. Another critical factor that influenced project implementation was the nurse shortage in California, with implications for the hospital and the PACs. As described in the UCSF Health Workforce Research report on Long-Term Care (Spetz et al., 2021), the supply of registered nurses in 2021 was estimated to be 40,567 full-time equivalent employment below demand, a 13.6% gap. The report projected the gap to persist until 2026, but the rapid exit of nurses during the COVID-19 pandemic suggests a longer enduring gap. Nurses were vital stakeholders in this project, both in the medical and the PAC facilities. Scarce workforce resources or competing priorities for them may make it challenging to sustain TOC interventions.

Conclusions

In heart failure patients, post-acute care collaboration using a pathway reduced the 30-day readmission rate of patients discharged to partnered PACs. Inter-organizational collaboration leading to HF readmission reduction is well-documented in the literature. The outcome of implementing the HF Continuum of Care pathway was consistent with the results reported in the

literature. This project attempted to create a disease management transition model to enhance the continuum of care for HF patients. Through the project, collaboration improved, processes were optimized to ensure patients had timely and consistent high-quality follow-ups on discharge, and the hospital had a well-functioning system to share information with the PACs. Collaboration between hospital and PAC facilities brought synergy to the management of HF patients and improved care.

The short-term implication of this change in practice was developing a post-acute care network and fostering a culture of collaboration. The anticipated long-term impacts of an established partnership between the medical center and PACs are reduced readmission rates, decreased episode cost, greater patient and family satisfaction, and improved patient safety. Heart failure management imposes a high economic burden, with readmissions being a key driver of cost. Reducing avoidable readmissions mitigates penalty risks while reducing the cost of care. The outcome and process measures will be monitored for another six months to understand the ongoing effectiveness of the intervention and its potential application in other high-risk patient populations. The project provided evidence consistent with the body of literature supporting inter-organization collaboration as a practice change for the transition of care.

Funding

There were no funding sources associated with this evidence-based quality improvement project. All resources associated with the investigation, development, implementation, and evaluation were included in the sponsoring organization’s budget allocation, and employee time was compensated within regular roles and duties.

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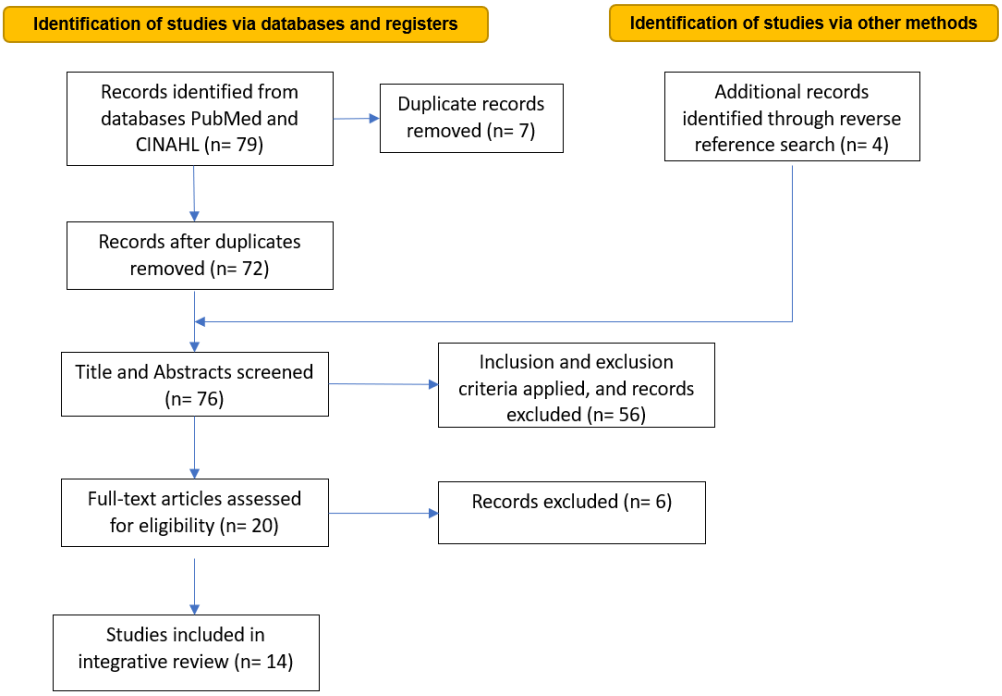
Appendix A

Literature Search Results and Selection Criteria (PRISMA Flow Chart)



Inclusion and Exclusion Criteria for Selecting Studies for Review

Inclusion Criteria	Exclusion Criteria
Keywords: Heart failure AND (post acute care OR transitional care OR skilled nursing facility OR rehabilitation facility OR home health agency) AND (readmission) AND (care coordination OR collaboration OR interprofessional OR partnerships)	Titles without terms
Heart Failure Readmission Reduction	Interventions by single discipline
Transition of Care from hospital to post-acute care facilities	Interventions that did not involve hospital
Multidisciplinary collaboration	No full-text available
HRRP initiatives	Case-study
EHR interoperability	Non-peer reviewed periodicals
English language	
Articles published during 2016- 2022	

HRRP: Hospital Readmission Reduction Program, EHR: Electronic Health Record

Appendix B

Evidence Evaluation Table

Purpose of article or review	Design / Method / Conceptual framework	Sample / setting	Major variables studied with definitions	Measurement of major variables	Data analysis	Study findings	Level of evidence (critical appraisal score) / Worth to practice / Strengths and weaknesses / Feasibility / Conclusion(s) / Recommendation(s)/
Adler-Milstein, J., Raphael, K., O'Malley, T. A., & Cross, D. A. (2021). Information sharing practices between US hospitals and skilled nursing facilities to support care transitions. *JAMA Network Open*, *4*(1), e2033980. https://doi.org/10.1001/jamanetworkopen.2020.33980							
To measure the completeness, timeliness, and usability of information shared by hospitals when discharging patients to SNFs, and to identify relational and structural characteristics associated with better hospital-SNF information sharing.	**Design:** QuaNtiative Structured survey **Methods:** The survey was pilot tested with semi-structured interview questions to Directors of Nursing of sample SNFs. Findings from pilot analysis was used to create 27 structured questions. Surveys were mailed to DONs of selected SNFs. The study was approved by the IRB at	**Sample:** 500 SNFs Respondent n= 265 SNFs, representing 471 SNF-hospital pairs **Setting:** Across U.S.	**IV 1**: Hospital relationship -Formal integration (ownership/colocation) -Informal integration (shared staffing across sites) **IV 2**: Information sharing -23 specific categories of necessary information **IV 3:** Facility and IT characteristics **DV:** Information sharing in the dimension of completeness,	For each dimension, a 5-point Likert scale from 1 (poor) to 5 (excellent) was used. The independent variables were assessed using "always/often," "sometimes," or "rarely/never." For relational characteristics, eight binary measures were used. The structural characteristics were examined for SNF (4 measures) and hospitals (5 measures).	Descriptive statistics used at the hospital-SNF pair level, overall performance, and of detailed measures of completeness, timeliness, and usability. conducted bivariate models, followed by multivariate logistic regressions. All results are presented using odds ratios (ORs). Analysis was conducted	Having a hospital clinician at the SNF was statistically significant for completeness ($p = .03$), timeliness ($p = .02$), and usability ($p = .04$). 49.6% did not meet the limit of at least 80% of information typically received. SNFs reported spending mean (SD) of 6.5 (8.2) hours per week on back-and-forth communication with the	**LOE: III- A** **Worth to practice:** The collaborative efforts to improve IT infrastructure and clinician spanning both sites are significant factors for information sharing. **Strengths:** It is a unique national survey of SNF DONs that focused on information sharing as the critical element of transition of care. The survey questions were pilot tested with small sample before finalizing which added validity and reliability of the tool. **Weaknesses:** The study does not assess the relationship between information sharing and outcomes such as readmissions or mortality. Since the study uses self-reported data, the responses were subjective. **Feasibility:** The gaps identified in the study are feasible to close with

Purpose of article or review	Design / Method / Conceptual framework	Sample / setting	Major variables studied with definitions	Measurement of major variables	Data analysis	Study findings	Level of evidence (critical appraisal score) / Worth to practice / Strengths and weaknesses / Feasibility / Conclusion(s) / Recommendation(s)/
	the Harvard T.H. Chan School of Public Health. **Framework:** American Association for Public Opinion Research (AAPOR) reporting guideline for survey studies.		timeliness, and usability		using SAS software, 9.4 (SAS Institute Inc).	hospital to obtain information. When SNF were formally integrated with the hospital, better completeness of information (P = .002). Participation in an accountable care organization noted better timeliness (p = .03).	standard practices and broader policy changes. **Conclusion(s):** For optimal care coordination, the hospital and SNFs need to invest in electronic data sharing and expand the scope of clinicians at both settings. **Recommendation(s):** The findings of the study are important for nursing, medical and IT leadership. Discharge summaries must be updated, and providers be accessible to ease the transition process.

Definition of abbreviations: SNF: Skilled nursing facility, DON: Director of Nursing, IRB: Institutional Review Board, OR: Odds Ratio, CI: Confidence Interval

Purpose of article or review	Design / Method / Conceptual framework	Sample / setting	Major variables studied with definitions	Measurement of major variables	Data analysis	Study findings	Level of evidence (critical appraisal score) / Worth to practice / Strengths and weaknesses / Feasibility / Conclusion(s) / Recommendation(s)/
Boykin, A., Wright, D., Stevens, L., & Gardner, L. (2018). Interprofessional care collaboration for patients with heart failure. *American Journal of Health-System Pharmacy*, *75*(1), e45–e49. https://doi.org/10.2146/ajhp160318							
To describe the collaboration between healthcare professionals during transition from hospital to the home setting.	**Design:** Quality improvement project **Method:** Team-based approach- Advance care practitioners, Community paramedics and TOC pharmacists. **Framework:** IHI Triple Aim goal: to improve patient experience, outcomes, and per-capita cost.	**Sample:** 86 patients discharged under HF collaborative care model compared to 596 patients with usual care over a 7-month period. **Setting:** 855 beds community teaching hospital	**IV:** Interdisciplinary interventions 1: TOC pharmacist-Medication education & reconciliation, assessing access and adherence barriers within 1 wk of discharge 2: Community Paramedic program for high-utilizers and high-risk readmission cases. The interventions included home safety inspections, conducting social support needs assessments, and connecting patients with community resources. Lab tests 3: ACP- Heart Strong program-	30-day readmission rate of patients with primary diagnosis of HF	Internal administrative data Shared EMR	The 30-day readmission rate under collaborative care model was 10.5% as compared to 23.5% with usual care during 7-month period.	**LOE: V-B** **Worth to practice:** A team approach to manage chronic conditions such as HF, ensures continuity of care and positively impacts the outcomes of readmission reduction. **Strengths:** - Grant funding for TOC pharmacist position which was converted to full-time position -Outreach by skilled community paramedics - Team-based approach with individual expertise -Real-time information sharing with shared EHR and resolution of issues. **Weaknesse**s: -Paramedic program available to only patients within 30-mile radius. - Being a QI study is it is specific to the local organization and may not be broadly generalizable **Feasibility**- Team based transition of care is a feasible model and may be successful in reducing readmissions for aging and high-risk HF patients

Purpose of article or review	Design / Method / Conceptual framework	Sample / setting	Major variables studied with definitions	Measurement of major variables	Data analysis	Study findings	Level of evidence (critical appraisal score) / Worth to practice / Strengths and weaknesses / Feasibility / Conclusion(s) / Recommendation(s)/
			management of acute symptoms, GDMT, referrals to advance therapies. 4: HF RN- 1:1 education, care coordination and medication adjustment **DV**: 30-day readmission rate for HF population				**Conclusion-** The high-utilizers/multi-visit patients are concerns for every organization. The collaboration with teams beyond acute care are promising to reduce rehospitalization. **Recommendation:** The partnership with community resources will address some of the SDOH issues. Socio-economic factors are also the reason for multiple readmissions among HF patients. Health Equity is one of the focus this year for the organization.
Definition of abbreviations: IV- Independent variable, DV- Dependent variable, IHI- Institute for Healthcare Improvement, HF- Heart Failure, TOC- Transition of Care, EMR- Electronic Medical Records, GDMT- Guideline Directed Medical Therapy, ACP- Advance care practitioners, SDOH- Social Determinants of Health							
Driscoll, A., Meagher, S., Kennedy, R., Hay, M., Banerji, J., Campbell, D., Cox, N., Gascard, D., Hare, D., Page, K., Nadurata, V., Sanders, R., & Patsamanis, H. (2016). What is the impact of systems of care for heart failure on patients diagnosed with heart failure: A systematic review. *BMC Cardiovascular Disorders*, *16*. https://doi.org/10.1186/s12872-016-0371-7							

Purpose of article or review	Design / Method / Conceptual framework	Sample / setting	Major variables studied with definitions	Measurement of major variables	Data analysis	Study findings	Level of evidence (critical appraisal score) / Worth to practice / Strengths and weaknesses / Feasibility / Conclusion(s) / Recommendation(s)/
Aim of the review was to examine systems of care for heart failure that reduce hospital readmissions and/or mortality	**Design:** Systematic review **Method**-Studies included were: English language, RCTs, non-RCTs, observational and cohort studies that reported systems of care for patients diagnosed with HF and aimed at reducing hospital readmissions and/or mortality. -Reviewed articles from January 2008 to August 2015 -Ovid, MEDLINE-(145), EMBASE (107), CINAHL (21), Cochrane Central Register of Controlled Trials (9), grey	**Sample**: Search yield (N= 520) articles n=29 met eligibility criteria (see Method for types of study designs) **Setting:** Worldwide	**IV**: Systems of care in the following 1: Specialist workforce, 2: primary care, 3: In-hospital care 4: Transitional/ Community based care 5: Nurse-led medication titration 6: Outpatient clinics 7: Telemonitoring/ telehealth **DV** 1: Readmission rates 2: Mortality rates	Quality of evidence assessed by: Newcastle-Ottawa Scale (NOS) for non-RCTs and GRADE rating tool for RCTs Cochrane Collaboration tool for risk of bias for randomized trials	Three authors selected articles independently based on inclusion and exclusion criteria. Disagreements were resolved by discussion and consensus between the three authors. PRISMA flow diagram	-Strong evidence r/t to implementation of heart failure service in the hospital. Care provided by heart failure service reduces hospital readmissions and mortality - Collaborative model with primary physician and cardiologist also improved patient outcomes compared to a primary physician only. - In-hospital QI programs improved the quality of care resulting in reduced hospital readmissions and mortality.	**LOE: III-B** **Worth to practice**: There are several findings that are helpful in HF management. **Strength**s: -Well-described methodology, quality of evidence and findings. **Weaknesses:** None from the systematic review. Limitations from heterogeneity of the interventions, end outcomes, length of f/u and study design, and unable to perform meta-analysis. **Feasibility**: The evidence could be used for designing pre & post discharge interventions and for developing partnership with PCP, outpatients & post-acute care facilities. **Conclusion:** HF is a chronic complex condition that worsens over time and will require effective systems of care. Organizations must implement bundle of interventions to obtain maximum benefit. **Recommendations:** Findings provides list of high-quality evidence to consider for

Purpose of article or review	Design / Method / Conceptual framework	Sample / setting	Major variables studied with definitions	Measurement of major variables	Data analysis	Study findings	Level of evidence (critical appraisal score) / Worth to practice / Strengths and weaknesses / Feasibility / Conclusion(s) / Recommendation(s)/
	literature, reviewed bibliographies, clinical trials registries (WHO ICTRP), clinical trials, heart failure guidelines **Framework:** Cochrane Highly Sensitive Search Strategy					- Nurse-led clinics, and early outpatient follow-up reduced hospital readmissions. - Lack of evidence as to the efficacy of telemonitoring with many studies finding conflicting evidence	implementation. It also warrants further study on telemonitoring/telehealth and involvement of primary care providers, especially now when the pandemic has shifted the modes of communication between providers and patients.

Definition of abbreviations: QI- Quality Improvement, WHO- World health Organization, ICTRP- International Clinical Trial Registry Platform, PCP- Primary Care Physicians, f/u- follow-up, GWTG- Get with the Guidelines, BOOST- Better Outcomes for Older Adults through safe transitions, STAAR- State Action on Avoidable Rehospitalization, H2H- Hospital-to-Home program

Purpose of article or review	Design / Method / Conceptual framework	Sample / setting	Major variables studied with definitions	Measurement of major variables	Data analysis	Study findings	Level of evidence (critical appraisal score) / Worth to practice / Strengths and weaknesses / Feasibility / Conclusion(s) / Recommendation(s)/
Flanagan, N. M., Rizzo, V. M., James, G. D., Spegman, A., & Barnawi, N. A. (2018). Predicting risk factors for 30-day readmissions following discharge from post-acute care. *Professional Case Management*, *23*(3), 139–146. https://doi.org/10.1097/NCM.0000000000000261							
a) To examine the relationship between individual-level determinants of health and those residents readmitted to the hospital within 30 days when discharged from the same SNF b) To identify and describe the risk factors of the residents readmitted within 30 days c) To use the findings to inform and refine current practice to target the mutable risk factors correlated with 30-day hospital readmission.	**Design:** Quantitative (non-experimental) Descriptive Study **Method:** Retrospective chart reviews of patients discharged from SNF to home and follow-up phone call to get 30-day readmission diagnosis. **Framework:** Andersen's Behavioral Model for Health Services Use	**Sample:** N=221 Patients ≥ 65yrs admitted to the SNF from Jan to Dec 2014 following hospitalization . **Setting:** 180-bed SNF in Northeastern Pennsylvania.	**IV:** Individual determinants of health, risk factors, and mutable risk factors. **DV:** 30-day hospital readmission	Data collected by two nurses, principal investigator and research assistant. Used an instrument developed specifically for the study. To measure Need Factors, following tools were used- a) CAM, b) Barthel Index, c) BIMS, d) GDS, e) Braden Scale, f) fall risk instrument developed by SNF. 30-day readmission data were collected by follow-up	Independent variables were cross tabulated with 30-day readmission, dichotomized as 30 days before and after readmission, and χ 2 analyses were conducted. To identify independent predictors, variables were entered into logistic regression model using forward Wald procedure. To understand pre-admission predictors, analysis was done after removing	Odds of readmission within 30 days were three times greater in patients with CHF ($p < 0.02$); Patients at "very high risk" on the Braden Scale were 20 times more likely to be readmitted before 30 days compared with those at low risk. Patients with diagnosis of COPD or pneumonia ($p < 0.003$) when arriving at the ED were over 14 times more likely to be readmitted. The following were not the predictors of	**LOE: III-B** **Worth to practice**: This is the first study that analyzed 30-day readmissions predictors after SNF discharge. CHF diagnosis again came as the top predictor for readmissions. Chronicity of CHF and COPD impacts mobility and malnutrition which could be addressed with targeted interventions of rehab and dietician. **Strengths**: Well-conducted retrospective study supported by grant from TAE Program at Binghamton University. **Weaknesses:** Sample was unrepresentative. Only one of the participants was non-white. Sample was from only one SNF. Biased data as chart may have inaccurate or missing information. Family self-reported the readmission diagnosis (Type II error) **Feasibility**: Evidence could be used to develop post-discharge best practices for SNF.

Purpose of article or review	Design / Method / Conceptual framework	Sample / setting	Major variables studied with definitions	Measurement of major variables	Data analysis	Study findings	Level of evidence (critical appraisal score) / Worth to practice / Strengths and weaknesses / Feasibility / Conclusion(s) / Recommendation(s)/
				phone call to patient.	admission diagnosis at readmission.	readmissions: marital status, age, and gender. Similarly, none of the other screening assessments were predictive.	**Conclusion:** Readmission rate lower than the national average may be due to leadership oversight and coordination of care by nursing and social workers. **Recommendations:** Even though the study setting was SNF, the malnutrition screening and nutrition consult can be initiated in the acute care setting.

Definition of abbreviations: SNF- Skilled Nursing Facility, Hgb-Hemoglobin, HCT- Hematocrit, CAM- Confusion Assessment Method, BIMS- Brief Interview for Mental Status, GDS- Geriatric Depression Scale, CHF- Congestive Heart Failure, COPD- Chronic Obstructive Pulmonary Disease, TAE- Transdisciplinary Areas of Excellence

Purpose of article or review	Design / Method / Conceptual framework	Sample / setting	Major variables studied with definitions	Measurement of major variables	Data analysis	Study findings	Level of evidence (critical appraisal score) / Worth to practice / Strengths and weaknesses / Feasibility / Conclusion(s) / Recommendation(s)/
Gupta, S., Zengul, F. D., Davlyatov, G. K., & Weech-Maldonado, R. (2019). Reduction in hospitals' readmission rates: Role of hospital-based skilled nursing facilities. I*nquiry: The Journal Of Health Care Organization, Provision, And Financing*, 56, 0046958018817994. https://doi.org/10.1177/0046958018817994							
To examine the association between HBSNFs and hospitals' readmission rates	**Design:** Nonexperimental correlational study **Methods:** Data sources included American Hospital Association Annual Survey, Area Health Resources Files, the Centers for Medicare and Medicaid Services (CMS) Medicare cost reports, and CMS Hospital Compare. **Framework:** a) Vertical Integration b) Resource-Based View of the Firm	**Sample:** All nonfederal medical/surgical, acute-care hospitals in U.S. between 2007 and 2012 N= 24,556 AMI: n=8357 CHF: n=13,464 Pneumonia: n= 14,114 **Setting:** Across U.S.	**IV:** Presence of HBSNF in a hospital **DV:** 30-day risk-adjusted readmission rates for AMI, CHF, and pneumonia	30-day risk-adjusted readmission rates for AMI, CHF, and pneumonia for Medicare beneficiaries aged 65 years or more from Hospital Compare website The presence or absence of an HBSNF in a hospital was measured based on number of HBSNF beds reported by the hospital in the AHA survey and Medicare Cost Reports.	Bivariate analysis to assess the differences in the organizational and market characteristics between hospitals with and without HBSNFs. GEE models were used to examine the effect of HBSNFs on the overall variation in hospitals' readmissions. To address potential selection bias propensity score weighting of the GEE models was done. Sensitivity	Between 2006 to 2012, 7% decrease in the proportion of hospitals with a SNF. The system-affiliated hospitals, as compared to the hospitals without affiliation, were associated with lower readmission rates for CHF ($\beta = -1.30$, $P < .001$). Hospital location had mixed effects on readmission rates. Higher proportion of SNFs to hospitals in the county had a significant association with lower readmission	**LOE: III- A** **Worth to practice: T**he study infers that the HBSNFs lower the readmission rates through better integration of communication and IT resources between acute and post-acute care facilities. **Strengths:** -The study national database and the analysis was extensive. -Study was approved by University of Alabama at Birmingham's IRB **Weaknesses:** -The independent variable was dichotomous which only considered the presence or absence of HBSNFs in hospitals. -The study did not capture the information related to the extent to which the hospitals that have HBSNFs utilize its services or the nature of coordination. **Feasibility:** Evidence could be used to develop horizontal integration with the SNF when vertical integration is not feasible. **Conclusion:** The study showed that over the years the proportion of hospitals with a SNF was decreasing. As the market is

Purpose of article or review	Design / Method / Conceptual framework	Sample / setting	Major variables studied with definitions	Measurement of major variables	Data analysis	Study findings	Level of evidence (critical appraisal score) / Worth to practice / Strengths and weaknesses / Feasibility / Conclusion(s) / Recommendation(s)/
					analysis, using the independent variable with 3 groups (hospitals that never had SNF, hospitals that changed their SNF status, and hospitals that always had SNF), was performed to examine the robustness of the results. SAS 9.3 and STATA 13 were used for data management and analyses	rates for CHF ($\beta = -0.10$, $P < .001$). The hospitals that always had HBSNFs experienced more significant reductions in their readmission rate compared with those that never had one.	shifting, the hospital and SNFs have to develop interorganizational networks and work on reducing readmissions collaboratively. **Recommendations:** Hospitals can develop strategies with the SNFs in their market such as improved clinician access and better information exchange through shared EHR.

Definition of abbreviations: HBSNF: Hospital-based skilled nursing facility, AMI: acute myocardial infarction, CHF: congestive heart failure, IRB: Institutional Review Board, U.S.: United States, GEE: Generalized estimating equation

Purpose of article or review	Design / Method / Conceptual framework	Sample / setting	Major variables studied with definitions	Measurement of major variables	Data analysis	Study findings	Level of evidence (critical appraisal score) / Worth to practice / Strengths and weaknesses / Feasibility / Conclusion(s) / Recommendation(s)/
Hinch, B. K., & Staffileno, B. A. (2021). Implementing a Heart Failure Transition Program to reduce 30-day readmissions. *Journal for Healthcare Quality*, *43*(2), 110–118. https://doi.org/10.1097/JHQ.0000000000000268							
To improve the continuum of care by implementing HF transitional services, thereby decreasing 30-day HF readmissions.	**Design:** Quality Improvement **Method:** Monthly data obtained from November 2016 to September 2017, before and after HFTP implementation through hospital EHR and Vizient Clinical Data Base. **Framework:** American Heart Association (AHA) Scientific Statement on Transitions of Care for Heart Failure Patients: Transitions of Care Recommendations for Clinical Practice	**Sample:** N= 466 patients **Setting:** Large Midwest academic medical center in an urban setting with approximately 700 patients discharged with primary diagnosis of HF annually.	**IV 1:** Comprehensive psychosocial evaluation by the SWCM within 24–48 hours of admission **IV2:** patient education with RN and CM staff **IV 3:** 7 to 10-day post discharge follow-up visit with HFNP **IV 4**: post-discharge PCP visit within 30-day **IV 5**: Post-discharge phone calls within 24-48hrs **IV 6:** Bridge SW call within 5-7 days of discharge **DV:** 30-day HF readmission	Readmission rates and discharge dispositions were obtained monthly through Vizient Clinical Data Base. All other data were extracted through the EMR retrospectively, 31 days after discharge, and stored in a secured database.	Descriptive statistics were used to assess continuous variables, and frequencies were used to assess categorical variables.	Post-HFTP cumulative readmission rate was 18.2% indicating improvement over the 11-month period. 42.7% readmissions occurred during days 1–10 and 34.1% during days 11–20. Among the readmissions, 57.3% were HF related. Only 39.7% of the scheduled patients kept the appointment with HFNP. The 30-day PCP visit was scheduled at discharge in 36.7% of patients, and	**LOE**: **V-A** **Worth to practice:** The deployment of high-intensity interventions in this HFTP program aligned with evidence noted in other studies. The project resulted in a reduction of HF 30-day readmissions. The interventions are worth improving continuum of care for HF patients. **Strengths:** The HFTP protocol tested out the AHA framework that included clear guidelines for multidisciplinary teams and was led by HFNP. **Weaknesses:** The interventions were primarily done by the acute hospital and collaboration with PAC involved only four preferred home health agencies. **Feasibility:** The NP-led transition program is feasible. **Conclusion(s):** The study reiterates the importance of communication between inpatient and outpatient care teams, especially during the

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						only 37.8% attended the first follow-up visit. The post-discharge calls by HFTP member were consistently high at 92.3%.	first week post-discharge when the chances of readmission are the highest. **Recommendation(s):** The AHA Transition of Care framework provides recommendations to build foundational interventions that are proven to be successful for HF patients. Resources are finite in the organization therefore only effective and economically sound transition of care interventions should be chosen

Definition of abbreviations: HFTP: Heart Failure Transition Program, AHA: American Heart Association, SW: Social Work, CM: Case Management, NP: Nurse Practitioner, EMR: Electronic Medical Record

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Jepma, P., Verweij, L., Buurman, B. M., Terbraak, M. S., Daliri, S., Latour, C. H. M., ter Riet, G., Karapinar - Çarkit, F., Dekker, J., Klunder, J. L., Liem, S.-S., Moons, A. H. M., Peters, R. J. G., & Scholte op Reimer, W. J. M. (2021). The nurse-coordinated cardiac care bridge transitional care programme: A randomised clinical trial. *Age and Ageing*, *50*(6), 2105–2115. https://doi.org/10.1093/ageing/afab146							
To evaluate the effects of nurse-coordinated 'cardiac care bridge (CCB) transitional care program' on unplanned hospital readmission and mortality.	**Design:** Single-blind, multicenter randomized clinical trial **Method:** Study conducted between 5 June 2017 and 31 March 2020. Approved by the Medical Ethics Committee of the Amsterdam University Medical Center and registered in the Dutch Trial Register. Stratified block randomization to the intervention or control group, allocation ratio 1:1, was used with pre-stratification by	**Sample**: 306 patients. Randomized (153/153) Cardiac patients ≥ 70 years that met eligibility criteria **Setting:** Six hospitals surrounding Amsterdam, The Netherlands	**IV: nurse coordinated** Cardiac Care Bridge Program **DV 1:** All- cause unplanned readmissions at 3, 6 and 12 months after randomization **DV 2:** Mortality at 3, 6 and 12 months after randomization	Mortality and readmission data collected from medical files and the Dutch National Personal Records Database. Also, included participants' self-reported readmissions to other hospitals. Data collections were performed by research nurses who were blinded to the treatment allocation.	Both univariate and multivariate analyses were conducted. The treatment effect was expressed as risk differences and risk ratios with corresponding 95% confidence intervals based on chi-square test. All statistical tests were 2-sided. Analyses were performed with SPSS 25.0 and Stata Statistical Software.	Average participant age was 82.4 years (SD 6.3) and 51% male. 58% were admitted for HF diagnosis. The incidence of the 6-month composite outcome of first all-cause readmission or mortality was 54.2% (83/153) in the intervention group and 47.7% (73/153) in the control group (RD 6.5%, 95% CI −4.7–18%, RR 1.14, 95% CI 0.91–1.42, P = 0.341). Similar results with multivariable	**LOE: I-A** **Worth to practice**: The nurse-coordinated transitional care interventions were not impactful on the high-risk older cardiac patients which indicates that the selected population may not be responsive to high-intensity preventive strategies and would benefit with more focus on quality-of-life efforts. **Strengths:** This study invested in an intensive training program and organized regular follow-up meetings -First study to combine case management, disease management and home-based CR in frail older patients with variety of cardiac diagnoses. **Weaknesses:** Only 9% of screened patients were considered eligible for the CCB program. The study was prematurely concluded due to development of regular transitional care for older cardiac patients in the study region. This impacted the power of the study.

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	study site and cognitive status (MMSE 15–23 vs ≥24). **Framework:** None					analysis. At three and 12 months after randomization, statistically non-significant differences were found on the composite outcome. The study found that the CCB program did not reduce hospital readmission or mortality within 6 months following hospitalization and there were no statistical difference at 3,6, and12 months.	**Conclusion:** The CCB program may not be beneficial for frail older cardiac patients. They may benefit from palliative interventions as opposed to preventive interventions. **Recommendation:** Careful consideration should be given when implementing strategies for various age groups.

Definition of abbreviations: CGA: Comprehensive geriatric assessment, PT: Physiotherapy, CN: Community Nurse, MMSE: Mini-mental State Examination, CR: Cardiac Rehab, CCB: Cardiac Care Bridge

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Naylor, M. D., Hirschman, K. B., Toles, M. P., Jarrín, O. F., Shaid, E., & Pauly, M. V. (2018). Adaptations of the evidence-based Transitional Care Model in the U.S. *Social Science & Medicine, 213*, 28–36. https://doi.org/10.1016/j.socscimed.2018.07.023							
Primary aim: To describe and classify common local adaptations of the Transitional Care Model (TCM). **Secondary aim:** To examine transitional care (TC) practitioners' perceptions regarding the effectiveness of their organizations' TC programs, compared to standard care.	**Design:** Mixed-methods research **Method:** *Quantitative phase*- Deployment of survey that resulted in classification of TCM's 10 component's adaptation. Multiple recruitment strategies: *Qualitative phase*: Additional data gathering by structured interviews of sample of survey respondents. **Framework:** Stirman's System of	**Sample:** Online survey- N= 582 respondents. n= 342 (59%) that reported use of TCM. n= 24 randomly selected for interview to expand understanding of nature reasons for TCM adaptations. **Setting:** Respondents well distributed across U.S. Multiple recruitment strategies: -invitations to practitioners who	**IV:** Implementation and adaptation of TCM components **Contextual components:** -Hospital to home -Screening -Staffing -Promoting continuity -Fostering coordination -Collaborating **Content components:** -Engaging patients & caregivers -Managing symptoms and other risks -Maintaining relationships - Educating/ promoting self-management **DV1:** Classification of TCM's component	First the quantitative data was collected through a survey. The survey questionnaire included 37 close-ended & 1 open-ended question. After analysis a sample was selected for the phone interview. The qualitative data was collected via structured phone interview. Guide was developed by the project team. Interviews were recorded, transcribed	T-tests used to compare the total TCM components adapted based on the organizational types (eg. hospital vs non-hospital settings). -STATA 14.0 software used for analyses. -Atlas.ti software used for managing data. Through survey results, count and frequencies of adapted TCM's components were analyzed. Telephone interviews	Qualitative findings: Two teams conducted the TC services. Hospital staff identified high risk patients and community staff made telephone calls and home visits. All interviewees mentioned that TCM was implemented to reduce hospitalizations & rehospitalizations. Quantitative findings: 4% of final sample implemented all 10 components. 96% reported a wide range of adaptation:	**LOE: III-A** **Worth to practice**: TCM is a well-known model. This study explores the adaptations of TCM model by organizations as sometimes its not feasible to implement all components of a model. **Strength:** -Robert Wood Johnson Foundation and AHRQ funded the research. - Well-conducted surveys & interviews - From findings, authors presented hypothesis at the end of the study for future research. **Weaknesses:** It would have been good to know if adaptations still improved outcomes. The perceived effectiveness of the adaptations was subjective. **Feasibility:** EBIs that are multicomponent are adapted all the time. **Conclusion:** The knowledge of adaptation is critical as sometimes adaptations may improve

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	Classifying Adaptations	completed the TCM webinar series or who participated in CMS's Center for Medicare and Medicaid Innovation funded initiatives r/t evidence-based TC. -Survey invitations sent by 32 national organizations to their members - Study information included in organization's e-newsletters.	based on adaptations **DV2:** Perception of effectiveness with total number of TCM adaptations as well as adaptations of individual components.	and verified for accuracy.	transcripts were put in a data matrix for comparison and identification of themes.	40% (1-3), 43% (4-6), and 17% (7-9). - Mean number of adaptations 4.4. - Adaptations of contextual components are very common and no statistical difference based on settings. The top three adaptations were delivering services from hospital to home, relying on APPs and fostering care continuity.	outcomes. Also, the adherence to models may create discordance between fidelity and adaptations. **Recommendation:** The knowledge will provide perspective on the degree of adaptation of the transition care model.
Definition of abbreviations: TC- Transitional Care, TCM- Transitional Care Model, APP- Advanced Practice Provider, EBI- Evidence-based Intervention							

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Raat, W., Smeets, M., Janssens, S., & Vaes, B. (2021). Impact of primary care involvement and setting on multidisciplinary heart failure management: A systematic review and meta-analysis. ESC Heart Failure, *8*(2), 802–818. https://doi.org/10.1002/ehf2.13152							
To compare outcomes of different multidisciplinary HF DMPs in relation to their recruitment setting and involvement of primary care health professionals	**Design:** Systematic review and meta-analysis of RCTs **Method:** Cochrane Collaboration methodology and PRISMA statement -Registered with PROSPERO (registration number CRD42019137637). - Databases: MEDLINE, Embase, and CENTRAL from 1st Jan 2001 to 31st December 2019. -Searched by MeSH & text terms + Boolean operators	**Sample**: Search yield N= 3651 studies n= 19 RCTs met eligibility criteria (7577 patients) Thirteen (5243 patients) in hospital setting and six (2334 patients) in the community	**IV 1:** Recruitment setting **IV 2:** Involvement of PCP **DV:** 1: All-cause readmission 2: HF readmissions 3: All- cause mortality 4: patient-reported outcomes 5: Costs	Quality of evidence was evaluated using Grading of Recommendations Assessment, Development and Evaluation approach.	Three reviewers: first reviewer independently reviewed and categorized the articles. Second reviewer checked all studies that were in 'included' and 'in-doubt' category. Third reviewer reviewed studies on which there were disagreements and final decision was made after discussion. -Quality and risk of bias were assessed using *Cochrane*	Multidisciplinary HF DMPs that recruit in the hospital have significant effect on mortality and readmissions as compared to DMPs that recruit in the community. - Multidisciplinary interventions compared with usual care: Reduction in all-cause readmission for (relative risk 0 .89, 95% CI [0 .82, 0 .98]); decrease in HF readmissions (relative risk 0 .76, 95% CI [0 .62 , 0 .93]), decrease in all-cause mortality (relative risk	**LOE: I-A** **Worth to practice:** PCPs are the key players in HF DMPs. These HF patients often have multiple comorbidities and require PCP oversight. At times these patients have no PCPs and burden falls on HF service. **Strengths:** -Included only RCTs for review and meta-analysis. - Included studies that had greater than 6-month f/u. **Weaknesses:** -Only two studies from USA. - Increased heterogeneity when several interventions were pooled based on their recruitment setting and primary care involvement, -limited number of studies involving PCP (6/19) that makes results inconclusive. **Conclusion:** It studies the impact of DMP with and without PCP. Even though the results were inconclusive, there is strong recommendation to involve PCP in the HF DMPs.

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	Framework: None noted				*Handbook for Systematic Reviews of Interventions.* Meta-regression analysis using binary categorical covariates; L'Abbé plots; meta-analyses with inverse variance weighting and random effects in RevMan version 5.3	0.79, 95% CI [0.68, 0.91]). PRO- Studies recruited in the hospital showed improvement in HF-specific QoL, depression scores and self-care. Also showed improved discharged preparedness and quality of TOC. No significant effect size difference noted between recruitment setting and PCP involvement for readmissions and moratlity.	**Recommendation**: High quality evidence on multidisciplinary DMPs impacting HF outcomes. Collaboration with PCPs will be key for successful TOC.
Definition of abbreviations: HF- Heart Failure, DMP- disease management programs, RCT- randomized controlled trial, QoL- Quality of Life, TOC- Transition of Care							

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Radhakrishnan, K., Jones, T. L., Weems, D., Knight, T. W., & Rice, W. H. (2018). Seamless transitions: Achieving patient safety through communication and collaboration. *Journal of Patient Safety*, *14*(1), e3–e5. https://doi.org/10.1097/PTS.0000000000000168							
To describe a collaborative transitional care pilot program (Transitions Across Care Settings [TRACS]) between seven-hospital health system and post-acute senior care service provider.	**Design:** The article mentions it as Case Report **Method:** Two healthcare organization partnered and implemented transitional care program (TRACS) for their mutual patients. **Framework**: Coleman Care Transitions Intervention model	**Sample**: N= 104 patients **Setting:** In Texas, seven-hospital health system & one post-acute care provider with 4-SNF, 1-HH, 1- Hospice. - Pilot over 12-month period	**IV**: Bundle of one hospital visit, one home visit and three f/u telephone calls over four weeks. **DV:** 30-day readmission rate of: 1: AMI 2: CHF 3: Pneumonia	- Patients could self-enroll in TRACS or referred by their physician. -All referrals were received by TRACS coach through electronic referral system (Curaspan, Newton, MA). -The coach maintained TRACS database, tracked transfers across the continuum & communicated information with SNF, HH, Hospice and hospital case management leaders weekly.	Using TRACS database Excel (Microsoft, Seattle, WA) database	Overall readmission rate- 4.8%; Cohort specific readmission rates: AMI- 0%, CHF- 7.1%, Pneumonia- 4.4% There is no mention of readmission rate for non-TRACS cohort.	**LOE: V- B** **Worth to practice**: -Demonstrate that large health-systems and post-acute care providers can partner towards efficient TOC model. **Strengths:** -The project received two FTEs to start the TOC model. - Tailored education on the "4 pillars" of patient self-management **Weaknesses:** -the description of intervention, especially the predischarge visit was not explained. -Not explained if the readmission rate of enrollees was to same seven facilities or any facilities. -The pre-intervention readmission rate is not mentioned in the study. - No comparison with non-TRACS cohort's readmission rate. **Feasibility:** Evidence is applicable to build partnership with post-acute care providers. **Conclusion**- Useful for large post-acute care providers to invest in a

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							dedicated coach/liaison to maintain database across systems and be the central point of communication. **Recommendation:** -Higher leadership commitment is key to undertake such collaboration. -Evaluate other studies that have implemented similar multi-system collaboration model with successful outcomes.

Definition of abbreviations: SNF-Skilled Nursing Facility, HH- Home Health, AMI- Acute myocardial infarction, CHF- Congestive heart failure, FTE- full-time equivalents, TRACS- Transitions Across Care Settings

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Samal, L., Dykes, P. C., Greenberg, J. O., Hasan, O., Venkatesh, A. K., Volk, L. A., & Bates, D. W. (2016). Care coordination gaps due to lack of interoperability in the United States: A qualitative study and literature review. *BMC Health Services Research, 16*, 1–8. https://doi.org/10.1186/s12913-016-1373-y							
To determine, from a clinician perspective, how care is coordinated and to what extent HIT is involved when transitioning patients between emergency departments (ED), acute care hospitals (ACH), skilled nursing facilities (SNF), and home health agencies (HHA) in settings across the United States	**Design:** Qualitative study **Method:** Clinicians and IT professionals were chosen from six regions of U.S. to participate in the focus group interviews. Authors also conducted literature review of MEDLINE, CINAHL, and Embase with no date restrictions, to analyze studies that included interventions to improve information transfer during transitions of care. **Framework:** Agency for	**Sample:** **N=**29 respondents. N= 10 articles for literature review **Setting:** Respondents were distributed across U.S.	**IV 1:** Use of HIT for care coordination activities **DV**: Clinician perspectives of care coordination, and HRT involvement.	Six one-hour 'focus group-style interviews' with clinicians and IT professionals were conducted. by two co-investigators over the telephone following a semi-structured interview guide. The interviews were conducted between May and June 2012. Codes were assigned to variables. For reporting ease, the variables were categorized in three levels:	Verbatim transcriptions of interviews were entered into QSR NVivo for coding and analysis. The care coordination domains were categorized in three levels: provider-level, patient-level and system-level. The interview responses were analyzed at each level for current capability of HIT and its future potential.	Significant gaps in information transfer, systems to monitor patients, tools to support patients' self-management goals and tools to link patients and their caregivers with community resources. Key barrier to effective HIT interventions is the lack of interoperability between EHRs, patient HIT tools, and community organizations' HIT tools. EHR are highly adopted in hospital, ED, SNF and	**LOE: III-A/B** **Worth to practice:** The interoperability challenges are still existing even after a decade. With the advances in HIT, it is worth pursuing the solutions, especially around electronic transfer of information between facilities, linkage to community resources, and development care pathways. **Strengths:** The study presents the primary data about care coordination gaps across diverse clinical settings and medicine and nursing disciplines. **Weaknesses:** Purposive sampling of the health system in small number of settings that limits generalization. The interview guide was self-developed and structured, it limits alteration of questions. **Feasibility:** Deploying HIT tools will depend upon the organizations' EHR capabilities and financial support.

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	Healthcare Research and Quality (AHRQ) Care Coordination Measurement Framework			provider-level, patient-level and system-level.		HHA but it is not interoperable, where these organizations can send and receive information electronically. Authors provide few recommendations on HIT innovations such as longitudinal care plan and linking patients to community resources using their zip code.	**Conclusion:** The study provides insight into the HIT related care coordination gaps and where there is better potential for innovation. **Recommendations:** The evidence from the study should be used for HIT innovations across the continuum. This would improve the quality-of-care coordination and thereby improve outcomes such as reduction in readmissions and medication errors.

Definition of abbreviations: AHRQ: Agency for Healthcare Research and Quality, HIT: Health Information Technology, ED: Emergency Department, SNF: Skilled Nursing Facility, HHA: Home Health Agency

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Summers, M. L., & Atav, S. (2020). Reducing hospital readmissions in upstate New York: Teasing out the effective programs. *Professional Case Management*, *25*(1), 26–36. https://doi.org/10.1097/NCM.0000000000000371							
To identify hospital programs, organizational characteristics, and levels of nursing involvement in hospital programs that contribute significantly to reductions in readmission rates and reimbursement penalties	**Design:** Ex post facto design; Nonexperimental **Method:** For the study, hospitals ranging from metropolitan to rural status were selected from upstate New York. Hospitals located near the New York City metropolis were excluded to ensure equitable representation. **Framework:** Synthesis of Ecological and Synergy models	**Sample:** N= 94 hospitals **Setting:** upstate New York (53 counties)	**IV 1:** Hospital readmission reduction programs **IV 2:** Organizational characteristics **IV 2:** Levels of nursing involvement in hospital programs **DV 1:** Hospital readmission rates **DV 2:** Reimbursement penalties	Data from CMS, Agency for Healthcare Research and Quality, NYSDOH, and specific hospital websites. When specific data were not available from hospital websites, hospital personnel were contacted by phone.	Bivariate analyses to assess whether there were significant differences in mean readmission rates and reimbursement penalties. Pearson correlation coefficient used to calculate relationship between the number of HRRP initiatives employed by hospitals and the various readmission and reimbursement outcomes. For the independent	Hospitals collaborating with certified home health agencies showed lower overall readmission rates than hospitals that did not. When hospitals utilized a post discharge phone call, readmission rates related to heart failure were higher. Hospitals collaborating with certified home health agencies, utilizing telehealth, or utilizing house calls showed lower PNA readmission rates.Hospitals	**LOE: III- B** **Worth to practice:** Higher the number of HRRP initiatives, better outcomes in terms of readmissions and thus lower reimbursement penalties. Collaboration with home health agencies had positive impact on readmission reduction. **Strengths:** Since it is a correlational study, the scope of generalization is better. The direction and strength of relationship of variables on outcomes will guide future studies on collaboration with post-acute care facilities. **Weaknesses:** The study did not list any limitations. The independent variable lacks the details for replication. **Feasibility:** Interventions require collaboration with multidisciplinary teams- internally and externally. Resources would be required to arrange house calls, telehealth and discharge phone calls.

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					variables with three or more groups, such as the level of nursing, analysis of variance (ANOVA) was used.	utilizing house calls and higher number of HRRP initiatives showed lower reimbursement penalties. APNs on the interdisciplinary team had a lower excess readmission ratio for pneumonia than hospitals with just RN or RN-led interdisciplinary teams.	**Conclusion:** The readmission reduction can be achieved mostly through the bundle of high-intensity interventions. **Recommendations:** The HRRP initiatives have shown to reduce readmissions. Organizations should support collaboration with post-acute care facilities and build a strong case management team.

Definition of abbreviations: HRRP: Hospital Readmission Reduction Program, RN: Registered Nurse, NYSDOH: New York State Department of Health, CMS: Center for Medicare and Medicaid Services, HRRP: Hospital Readmission Reduction Program

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Vedel, I., & Khanassov, V. (2015). Transitional care for patients with congestive heart failure: A systematic review and meta-analysis. *Annals of Family Medicine, 13*(6), 562–571. https://doi.org/10.1370/afm.1844							
To determine the impact of transitional care interventions (TCIs) on acute health service use by patients with congestive heart failure in primary care and to identify the most effective TCIs and their optimal duration	**Design:** Systematic review and meta-analysis of RCTs **Method:** Cochrane Collaboration methodology. Databases: MEDLINE, PsycINFO, EMBASE, and Cochrane Database of Systematic Reviews from 1995 to Feb 6, 2014. Language- English & French. Key words: Heart failure, transition, care planning & discharge. Outcomes reviewed between TCI	**Sample**: N= 11,423 studies n=41 RCTs that met eligibility criteria (RCTs and participating patients with CHF diagnosis on discharge. **Setting:** identified databases	**IV 1:** Transitional Care Interventions: Predischarge education by CHF nurse either via written material or video **IV2:** Discharge plan (Med review, individualized care plan & DC letter to PCP/cardiologist) **IV3:** Structured, proactive and prearranged f/u. **DV1:** All-cause readmission **DV2:** All- cause ED visits	Quality of studies was assessed by critical appraisal, the Downs and Black Scale. Team of experts created a taxonomy to classify TCI into homogenous group of interventions and their intensity.	Two reviewers independently examined the references based on the eligibility criteria. Full text of selected references were further reviewed per criteria. Used random-effects models to study the effect of different interventions. I^2 statistic used for measuring heterogeneity.	-Two critical TC elements were home visits by a nurse, and number of follow-up. - Home visits led to a reduction of readmissions, whereas phone calls did not. Home visits also eliminated transportation to the physicians' offices and pharmacies, among the main contributors to readmission of older patients. Frequency of visits also impacted long-term outcomes. Relative risk of readmission	**LOE: I-A** **Worth to practice:** High-intensity interventions and their durations impact risk of readmission. It would be beneficial to assess the frequency of such interventions. **Strengths:** -Study included 41 RCTs. - the data analysis was very comprehensive. - the measurement of intensity of the intervention was unique to this study **Weaknesses:** -None from the study itself. But the some of the RCTs had limited information on number of contacts and patient characteristics such as comorbidities and severity of CHF **Conclusion:** Just the implementation of TCI is not sufficient to impact outcome. The intensity of the intervention is also critical. **Recommendation**: High quality evidence on certain interventions

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	group and the usual care group. **Framework:** PRISMA framework for reporting the results					with a TCI as compared with usual care (RR=0.92; 95% CI, 0.87- 0.98), indicating that TCI reduces the risk of readmission by an average of 8%. 29% reduction in the risk of ED visits for TCI as compared with usual care (RR=0.71; 95% CI, 0.52-0.98). High-intensity interventions are efficacious at reducing the risk of readmission	when combined over a consistent period creates maximum benefit. A combination of home visits with other types of follow-ups (telephone and/or clinic follow-up) or Telecare combined with prearranged direct contact with patients (e.g., home visits, telephone follow-up, video visits)

Definition of abbreviations: TCI- Transitional Care Interventions, CHF- Congestive Heart Failure, DC- Discharge, ED- Emergency Department, RCT- Randomized Control Trial

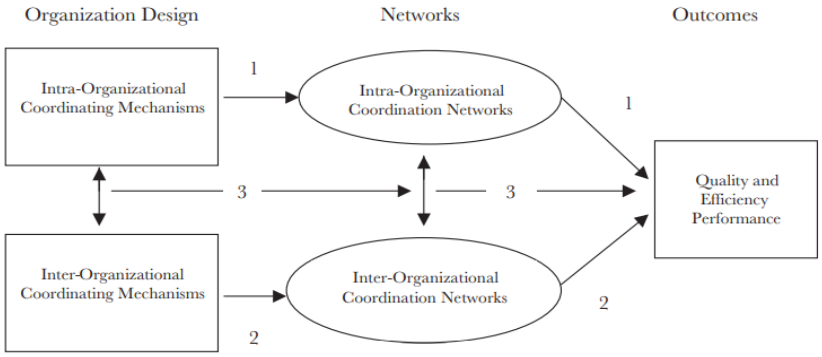
Purpose of article or review	Design / Method / Conceptual framework	Sample / setting	Major variables studied with definitions	Measurement of major variables	Data analysis	Study findings	Level of evidence (critical appraisal score) / Worth to practice / Strengths and weaknesses / Feasibility / Conclusion(s) / Recommendation(s)/
Weerahandi, H., Bao, H., Herrin, J., Dharmarajan, K., Ross, J. S., Jones, S., & Horwitz, L. I. (2020). Home health care after skilled nursing facility discharge following heart failure hospitalization. *Journal of the American Geriatrics Society*, 68(1), 96–102. https://doi.org/10.1111/jgs.16179							
To study if home health care affects readmission during the transition from SNF to home after HF hospitalization	**Design:** Retrospective cohort study; Observational design **Method:** Medicare Standard Analytic Files were used to identify admissions to hospital & SNF. Merged with Medicare Denominator files that contained patient-level information. Excluded cases with admissions 30 days after hospital discharge and admissions less than one day in SNF.	**Sample:** N= 67,585 DC with HHC- 13,257 (19.6%) DC without HHC- 54,328 (80.4%) Beneficiaries, aged ≥ 65yrs with HF diagnosis discharged to SNF and then discharged home. **Setting:** Fee-for-service Medicare database, 2012 to 2015	**IV 1:** Discharge from SNF to home with HHC **DV 1:** Unplanned readmissions within 30-day of discharge to home from SNF **DV2:** Readmission rate for patients with and without HHC services	Unplanned readmissions per CMS's methodology.	Comparison done using descriptive statistics, Elixhauser comorbidity scores. The time to unplanned readmission was compared using a multivariable Cox proportional hazards model. Pt discharged with HHC were more likely to be female, ~~to be~~ black, and ~~to~~ have shorter SNF LOS as compared to those without. Pt with HHC were also	Readmission Rate for: DC with HHC- 22.8% DC without HHC- 24.5% The risk od readmission is lower in patients discharging with HHC than those discharged home without HHC. The days between readmission is longer for patient discharged with HHC (11days) as compared to those without (9 days)($P < 0.0001$). This was new knowledge as	**LOE: III-A** **Worth to practice**: patients transferred to SNF has been increasing over the years considering some functional impairment. Chances of readmissions are high in this population. This study shows that having HHC after SNF DC decreases the readmission risk. **Strengths:** This work received a research grant from AHRQ, the National Center for Advancing Translational Sciences, and National Heart, Lung, and Blood Institute of National Institutes of Health. -First study to use national data set to look at HHC impact from SNF to home discharges **Weaknesses:** -Observational designs preclude causal inferences. -The SNF quality of care data was available only from 2016 to 2018 which does not reflect the quality from 2012 to 2015.

Purpose of article or review	Design / Method / Conceptual framework	Sample / setting	Major variables studied with definitions	Measurement of major variables	Data analysis	Study findings	Level of evidence (critical appraisal score) / Worth to practice / Strengths and weaknesses / Feasibility / Conclusion(s) / Recommendation(s)/
	Framework: None				more likely to be discharged from SNF with more PT hours per resident per day and higher total nurse staffing hours per resident per day at their home (not in the SNF facility).	patients discharged with HHC usually require additional restorative services.; however, only 20% received HHC services. Mortality without readmission within 30 days was lower (3.1%) in pts discharged with HHC vas 4.1% for those without.	**Conclusion:** Only 20% of HF patients receive HHC after SNF discharge. **Recommendation:** The transition from hospital to home and from SNF to home can be supported by home health care but the utility is very low.
Definition of abbreviations: HHC- Home Health Care, SNF- Skilled Nursing Facility, AHRQ- Agency for Healthcare Research and Quality, LOS- Length of Stay							

Appendix C

Coordination Networks - A Multi-Level Framework

The multi-level framework introduces the concept of intra and inter-organizational design and networks for coordination of care with external organizations (Gittell & Weiss, 2004)



Proposition 1: Intra-organizational design (e.g., routines, information systems, team meetings, boundary spanners) can improve quality and efficiency performance by strengthening intra-organizational coordination networks; Proposition 2: Inter-organizational design (e.g., routines, information systems, team meetings, boundary spanners) can improve quality and efficiency performance by strengthening inter-organizational coordination networks; Proposition 3: The similarity of intra and inter-organizational design (e.g., routines, information systems, team meetings, boundary spanners) improves quality and efficiency performance by strengthening the interface between intra and interorganizational networks.

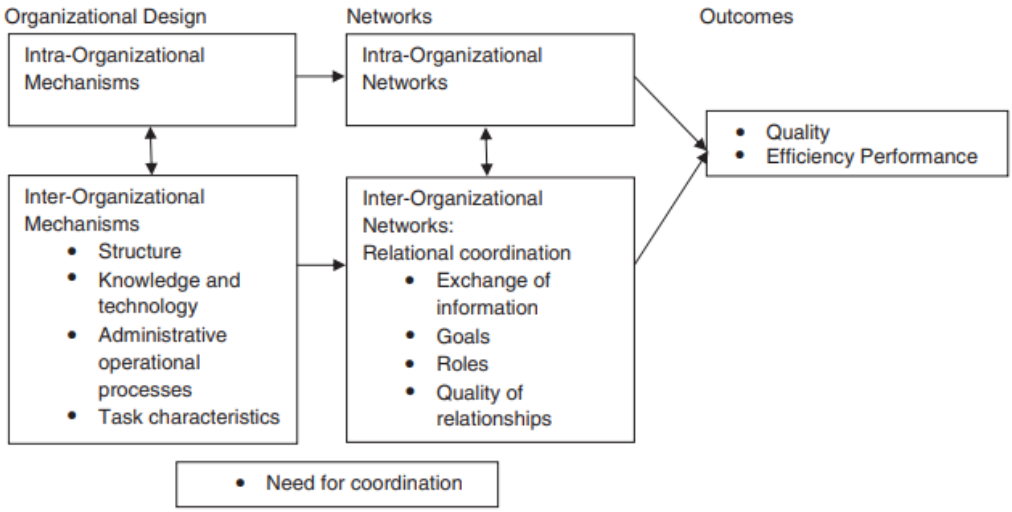
Reference

Gittell, J. H., & Weiss, L. (2004). Coordination networks within and across organizations: A multi-level framework. *Journal of Management Studies*, *41*(1), 127–153. https://doi.org/10.1111/j.1467-6486.2004.00424.x

Appendix D

Van Houdt's Multi-Level Framework

Van Houdt et al. (2013) further defined the multi-level framework with specific concepts related to intra and inter-organizational mechanisms and networks to show care coordination between hospital and primary care. This model aligns with the DNP project's aim to build collaboration with post-acute care facilities.



Source: Van Houdt, S., Heyrman, J., Vanhaecht, K., Sermeus, W., & De Lepeleire, J. (2013). Care pathways across the primary-hospital care continuum: Using the multi-level framework in explaining care coordination. *BMC Health Services Research*, *13*(1), 1–12. https://doi.org/10.1186/1472-6963-13-296

Appendix E

Letter of Support

Stanford HEALTH CARE | Office of the CMO

Date: 08/02/2021

University of San Francisco, School of Nursing

2130 Fulton Street

San Francisco, CA 94117-1080

To whom it may concern:

I am writing to express my support of Purnima Krishna to implement her Doctor of Nursing Practice Comprehensive Project at Stanford Health Care. Purnima's project is of significant scope. She will be developing a continuum of care model for heart failure patients by collaborating with post-acute care facilities.

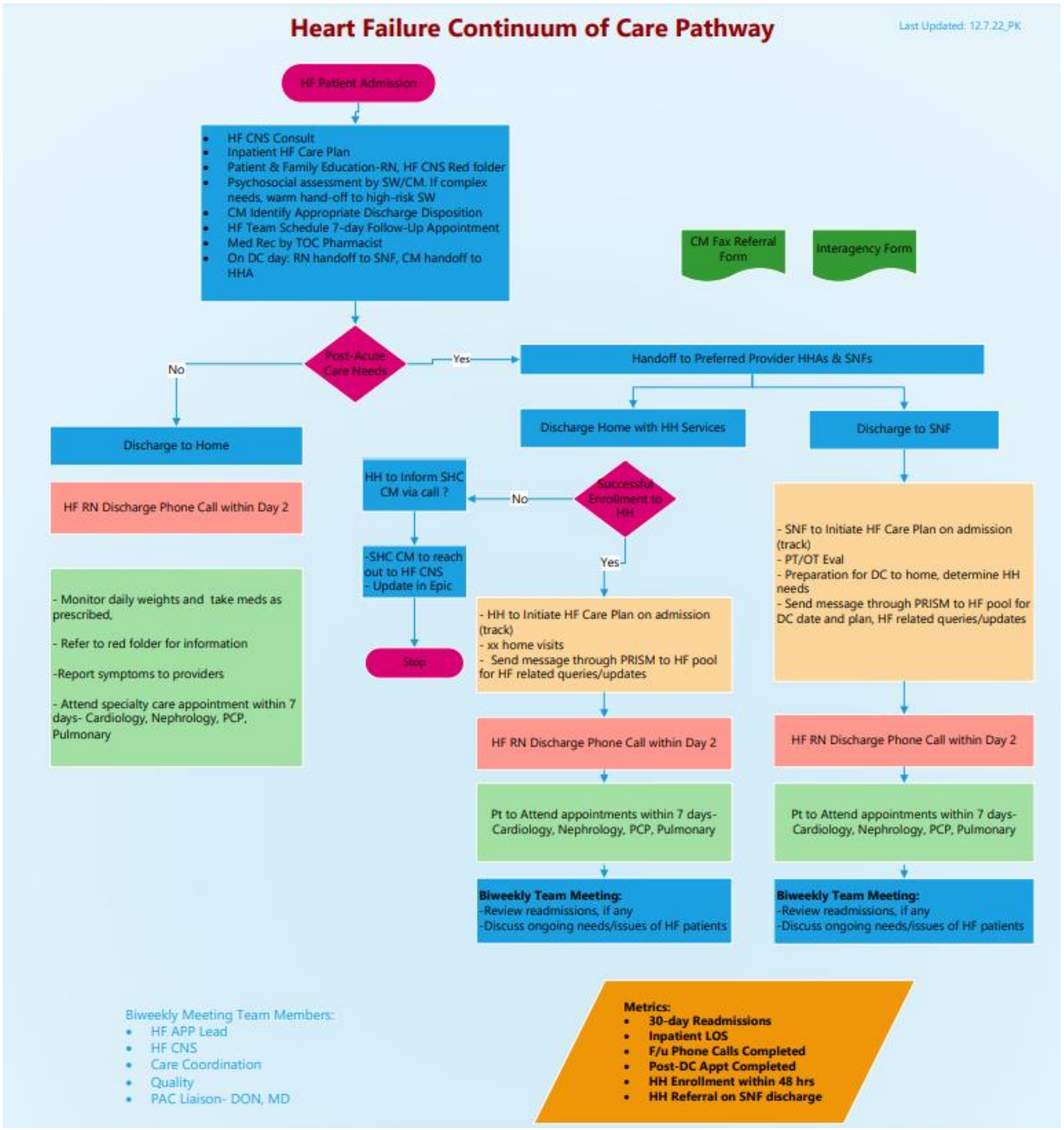
This letter also verifies that Stanford Health Care has an existing contract with the University of San Francisco's School of Nursing.

Sincerely,

Paul Maggio, MD, MBA, FACS
Chief Quality Officer
Stanford Health Care

Appendix F

Heart Failure Continuum of Care Pathway



Appendix G

CVH-Heart Failure Post-Acute Care Provider Agenda template

SHC CVH-HEART FAILURE POST ACUTE CARE PROVIDER AGENDA (HH)

Post-Acute Partner:				
Attendees:				
Date/Time:			Data Lookback Period:	
Volume:	# of Readmits	% Readmissions FYTD	Causal Factors:	

Patient ID:	Clinical / Patient Progress:	HH <48hrs?	Challenges / Improvement Opportunities

Action Items (What):	Who:	By When:

Appendix H

Heart Failure Transitions of Care Knowledge Assessment

1. How important is for the RN to have the knowledge of interventions that ensures continuity of care for heart failure patients after discharge?
    - Extremely important
    - Very important
    - Somewhat important
    - Not so important

2. I understand my care transitions responsibilities when heart failure patients are discharging to post-acute care facilities (SNF, Home Health) or home.
    - Very familiar
    - Somewhat familiar
    - Not so familiar
    - Not at all familiar

3. I am aware of my patient's discharge care plan (wound and line care, dialysis, DME needs) and I check to ensure the discharge documents (i.e. AVS, interagency form, physician orders, and discharge summary, case management notes, appointments) reflect that plan. I know who to contact for clarification.
    - Always
    - Most of the time
    - Sometimes
    - Never
    - Not applicable

4. I liaise with Case Management/ Social work to address post-discharge barriers for the patient and their families?
    - Always
    - Most of the time
    - Sometimes
    - Never
    - Not applicable

5. Effective care transitions will improve the quality outcomes such as readmissions and length of stay.
    - Strongly disagree
    - Disagree
    - Neither agree nor disagree
    - Agree

- Strongly agree

6. Heart failure patients have a good understanding of what to do if problems arise after discharge.
   - Strongly disagree
   - Disagree
   - Neither agree nor disagree
   - Agree
   - Strongly agree

7. To my knowledge, the discharge planning activities (such as PT/OT eval, CNS consult, dietary consult, patient education, medication reconciliation, case management) currently in place provide effective transitions of care at discharge for heart failure patients.
   - Strongly disagree
   - Disagree
   - Neither agree nor disagree
   - Agree
   - Strongly agree

8. I feel confident in what to include in the verbal & written handoff to the next post-acute care setting.
   - Yes, to the full extent
   - To some extent
   - Not aware at all

9. In my opinion, the common reasons for heart failure readmission within 30-days are:

   Enter your answer:

10. Any other comments, questions, or concerns regarding heart failure discharge processes:

    Enter your answer:

Appendix I

Nurse Transition of Care Tip Sheet

Stanford MEDICINE Health Care

Nurse Tipsheet: Improving Transitions of Care for Heart Failure Patients Discharged to Post-Acute Care (PAC) Facilities

Purpose: provide best practices during post-acute care transitions and to reduce re-admssions

1-Preparing Patient and Family for Discharge to SNF/Acute Rehab:

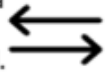
- ✓ **Education: reinforce Heart failure teachings with patients and their caregivers-that they will need to continue all of the HF interventions that we started here in the hospital after they leave (**low sodium diet, getting a daily weight, taking their medications as ordered, fluid restriction-if indicated), when they need to report symptoms to their new care team, and the importance of getting to their follow up appointments. Reinforce and chart **teach back in patient education** (even if unable to completely do so).

- ✓ Start setting expectations early, research shows that patients have poor satisfaction/non adherence when they are not prepared for their transition out of the hospital to SNF. This can contribute to poor outcomes. Our goal is to set their expectations for after leaving such as continuing their physical therapy to get stronger and eating a low sodium diet.

- ✓ Refer to the **Heart Failure flowsheet** in EPIC to see if education has been completed by CNS team. Contact CNS team as needed

2-Day of Discharge and Handoff to SNF/PAC:

- ✓ Emphasize **HF patient admission diagnosis** in your verbal handoff to PAC nurse and give a brief review of patients HF care plans (weights, low sodium, etc). Include any patient specific **barriers to therapy adherence,** these can be behavioral, physical or psychosocial.



- ✓ Inform accepting nurse that a HF transition of care nurse will **call the facility within 48 hours** to follow up and answer any questions!

- ✓ **MAR report:** do not print until **last medication** has been given. Include in CM packet along with interagency form. Please note that interagency form now has a clear indicator of the HF diagnosis (see below):

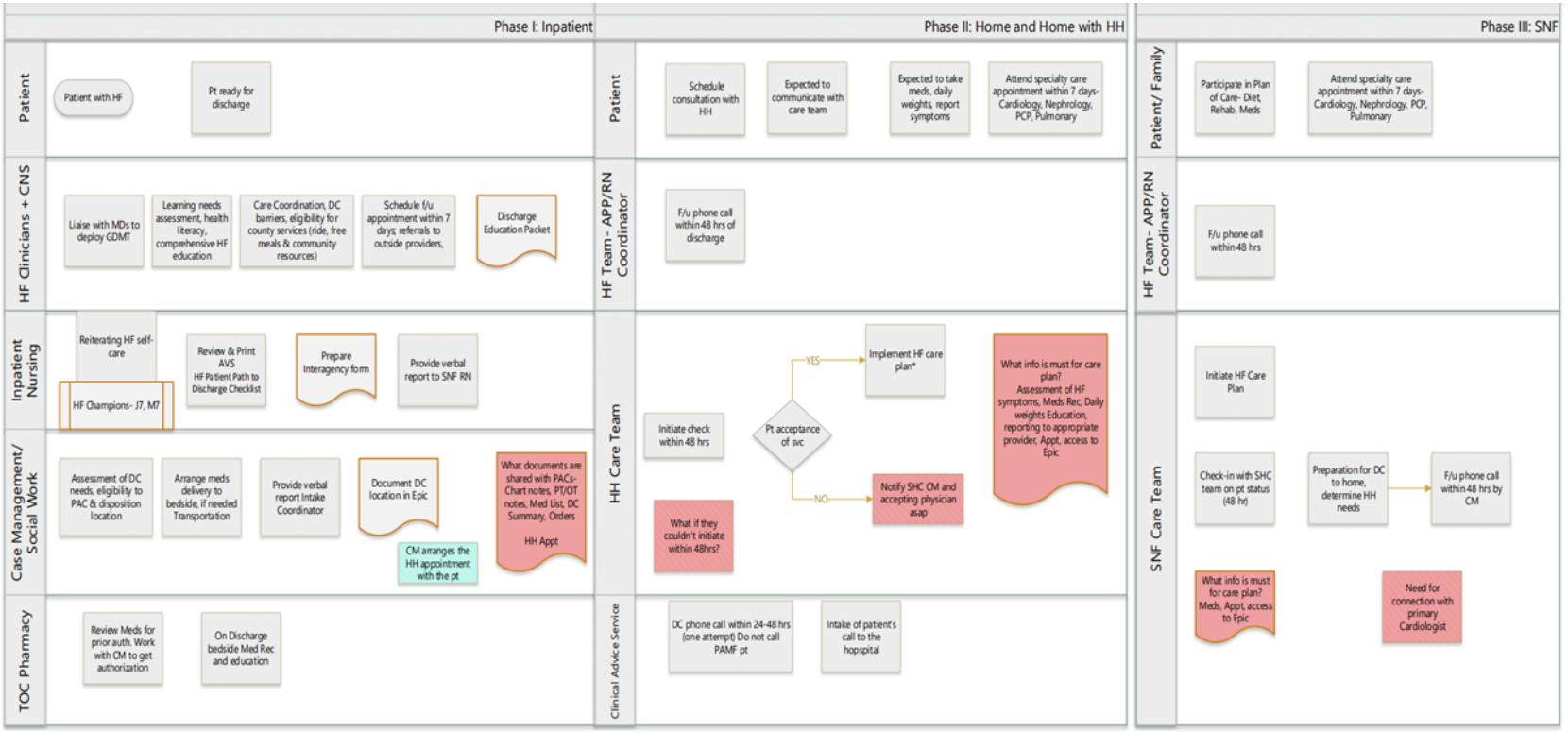
- ✓ **Home Health:** If patient is discharging home with home health, ensure that they have their **AVS** and **Red HF folder** available for visiting team members to review and use. They should expect a call from the HH agency in 48 hrs.

Thank you for the key role you play in a patients continuum of care as they leave our unit and continue their care at home and in skilled nursing facilities!

Payoff: Improved patient experience and reduced readmissions.

Appendix J

Current State Workflow



Appendix K

Gap Analysis

Area under consideration: Transition of heart failure (HF) patients from acute to post-acute care (PAC) settings.		
Desired State	**Current State**	**Action Steps**
Efficient post-acute care network management	• Lack of data driven network evaluation. • No formal collaboration with PAC facilities.	• Identify and prioritize engagement with preferred providers. Discuss outcomes and strategize readmission reduction efforts
Formalize care team roles and responsibilities	• Unclear expectations on HF best practices and guidelines both at the hospital and at PAC facilities	• Identify multidisciplinary members that influences transition of care. • Test workflows that support high-intensity interventions. • Educate care transition pathway
Proactive PAC planning	• Insufficient care coordination support due to high census. • Lack of beds at desired skilled nursing facilities (SNFs).	• Work with care coordination leadership to ensure sufficient coverage to the CVH service line. Explore service line funded Case Management position. • Initiate insurance review and referral options during admission and reach out to PAC facilities early.
Maximize technology for communication and information sharing	• SNFs and Home Health Agencies (HHAs) lack access to hospitals EHR • Handoff reports lacks clarity of key transition information • SNFs and HHAs can't easily identify HF patients to initiate HF specific care plans	• Facilitate access to EHR's PRISM module from where SNFs and HHAs can review progress and discharge notes of inpatient stay. • Update interagency forms to include specific information of patient status and support system. • Work with IT to build automated HF patient identification for SNFs and HHAs
Enhance patient and family engagement	• Lack of clarity on patient and family perspective on transition to PAC settings. • Non-adherence to diet, exercise, and fluid management • Lack of patient engagement when followed up post discharge.	• Interview patients and their families to understand the transition needs. • Proactive assessment by Care Coordinators on psychosocial barriers leading to non-adherence. Establishing patients with community resources. • Educating patients and families on the benefits of follow-up.

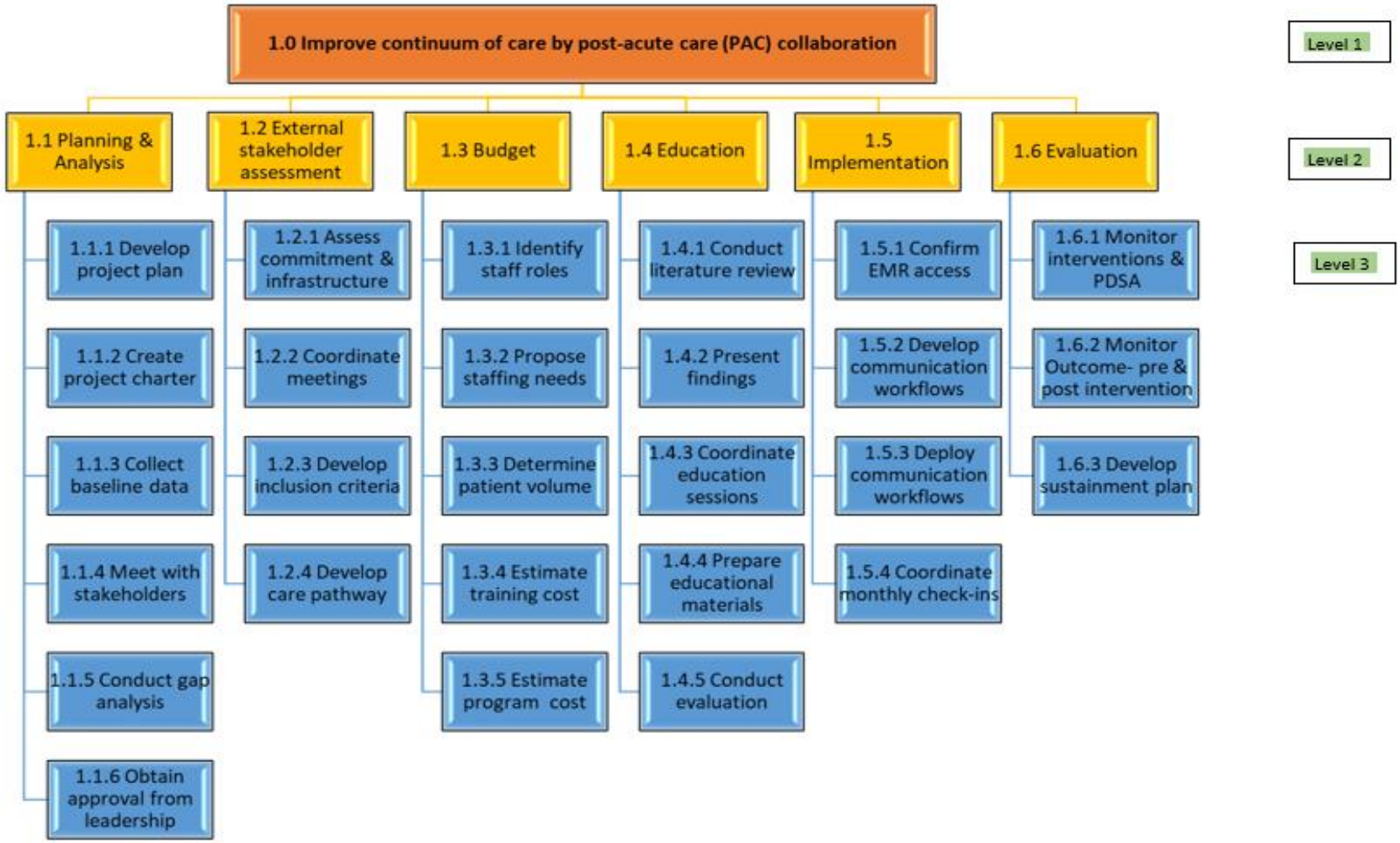
Appendix L

Gantt Chart

EL-DNP Project Plan:	2021								2022												2023			
	May	June	July	August	September	October	November	December	January	February	March	April	May	June	July	August	September	October	November	December	January	February	March	April
Semester 1: Summer 2021																								
Project Identification																								
Create patient transitions taskforce																								
Obtain baseline data																								
Identify key stakeholders and meet with them																								
Create AIM Statement																								
Conduct gap analysis																								
Obtain approvals for the DNP Project																								
Conduct literature search																								
Project plan draft																								
Semester 2: Fall 2021																								
Identify PACs based on critieria																								
Coordinate HF Task Force meetings																								
Participate in PAC meetings																								
Current state workflow development																								
Finalize project plan																								
Semester 3: Spring 2022																								
Knowledge Assessment survey- Pre																								
Follow-up with IT/Epic regarding electronic workflows																								
Finalize Interagency Form edits																								
Development of care pathway																								
Obtain feedback from patient on key pathway elements																								
Develop educational materials for Nursing																								
Semester 4: Summer 2022																								
Finalize care pathway																								
Prepare for training of key teams																								
Set-up data monitoring system																								
Prepare for go-live																								
Semester 5: Fall 2022																								
Coordinate HF Task Force meetings																								
Coordinate PAC meetings																								
Finalize electronic workflows																								
Semester 6: Spring 2023																								
Conduct check-in meetings																								
Knowledge Assessment survey- Post																								
Evaluate outcomes																								
Present outcomes																								

Appendix M

Work Breakdown Structure



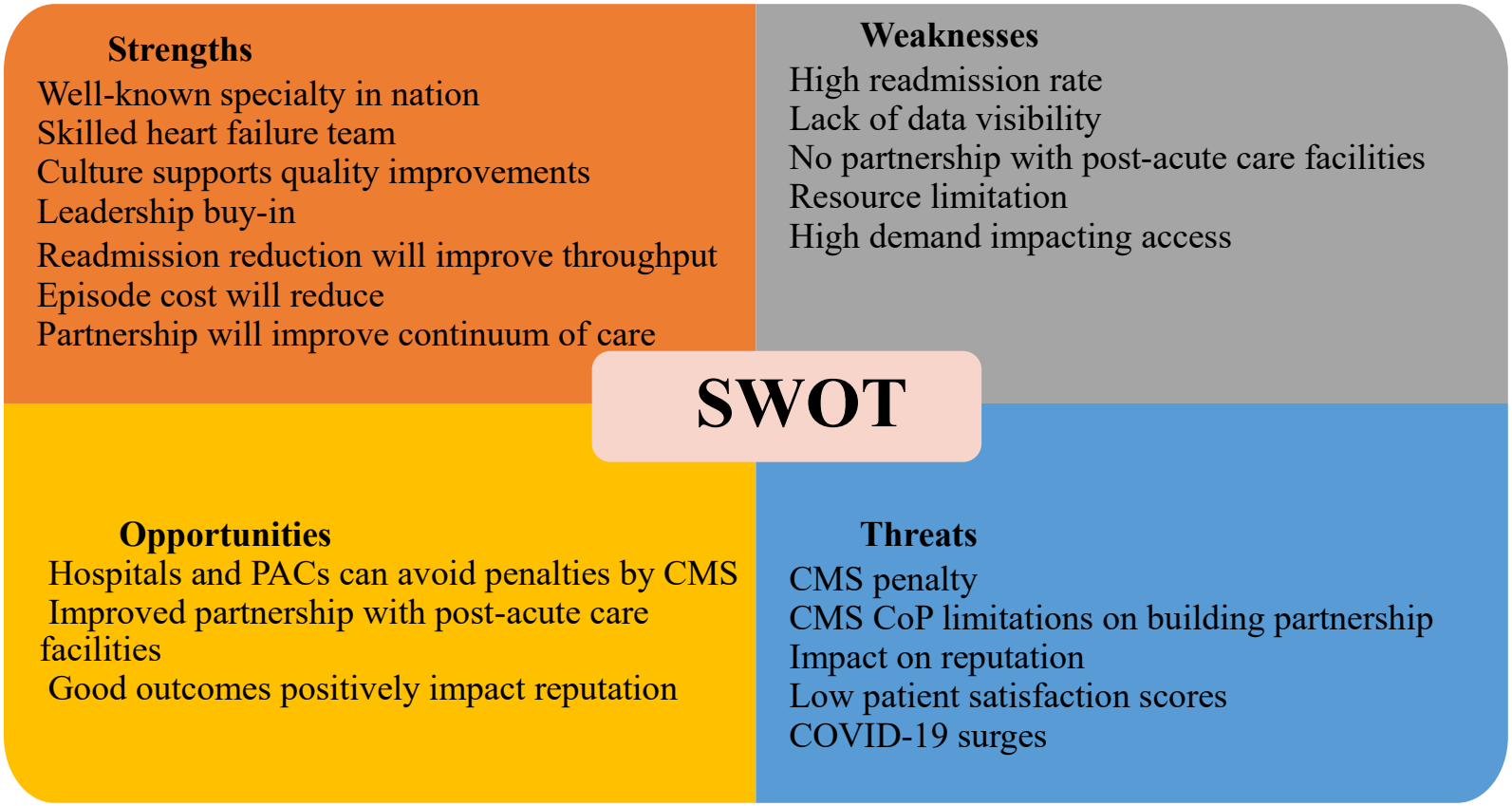
Appendix N

Responsibility/Communication Plan

Communication	Who	Frequency	Goal	Route
Academic Advisors	P. Krishna	Weekly	• Review project status, discuss barriers and updates, share progress	Email, zoom, phone calls
Project Sponsors	P. Krishna	Monthly and as needed	• Status of project • Issues needing resolution	1:1
Compliance Manager	P. Krishna	Quarterly and as needed	• Review project content	Email
PAC Sponsors	P. Krishna	Monthly and as needed	• Status of project • Issues needing resolution	Conference calls
Inpatient & Clinic Managers	P. Krishna	Monthly (Until go-live)	• Workflow efficiencies and change in practice	Conference calls with FAQs
Heart Failure Clinical Effectiveness Council	P. Krishna	Bi-monthly	• Status of project • Obtain approval of pathway	Presentation
Cardiology Faculty	D. Payne	Once (Before go-live) Monthly (Post)	• Overview and workflow changes • Copy of care pathway • Share results	Email
Care Coordination Team	S. Peavler	Once (Before go-live) Monthly (Post)	• Overview and workflow changes • Copy of care pathway • Share results	Email
PAC Managers and staff	PAC Task Force representative/P. Krishna	Once (Before go-live) Monthly (Post)	• Overview and workflow changes • Copy of care pathway • Share results	Email/virtual meetings

Appendix O

SWOT Analysis



Appendix P

Budget

Category of Implementation Costs	Planning, Development and Implementation						Ongoing Operation and Maintenance Costs
	Quantity	Labor Hours	Total Labor Hours	Costs	Other Costs	Total Costs	
Salaries & Wages (In-kind Services)	Project Wage and Hour Assumptions						
HF Task Force Meetings							
HF CNS	1	150	150	$ 70.00	$0.00	$ 10,500.00	$ 1,960.00
HF APP Lead	1	20	20	$ 80.00	$0.00	$ 1,600.00	
Care Coordinator Manager	1	50	50	$ 80.00	$0.00	$ 4,000.00	$ 2,240.00
Care Coordinator Exec Director	1	50	50	$ 120.00	$0.00	$ 6,000.00	
HF Clinic Director	1	30	30	$ 90.00	$0.00	$ 2,700.00	
Project Coordinator	1	100	100	$ 60.00	$0.00	$ 6,000.00	
Executive Sponsor	1	4	4	$ 180.00	$0.00	$ 720.00	
Quality Director- Project Lead	1	200	200	$ 110.00	$0.00	$ 22,000.00	$ 2,200.00
Quality Consultant	1	50	50	$ 80.00	$0.00	$ 4,000.00	$ 2,240.00
Clinical Educator	1	10	10	$ 85.00	$0.00	$ 850.00	
Nursing Manager	1	5	5	$ 110.00	$0.00	$ 550.00	
S & W Subtotal						$ 58,920.00	$ 8,640.00
Expenses							
Supplies	0			$0.00	$0.00	$0.00	
Training materials	0			$0.00	$0.00	$0.00	
Meals & Refreshments	4			$ 30.00	$0.00	$ 120.00	$ 200.00
Purchased services				$0.00	$0.00	$0.00	
Expenses Subtotal						$ 120.00	200
Total						$ 59,040.00	$ 8,840.00

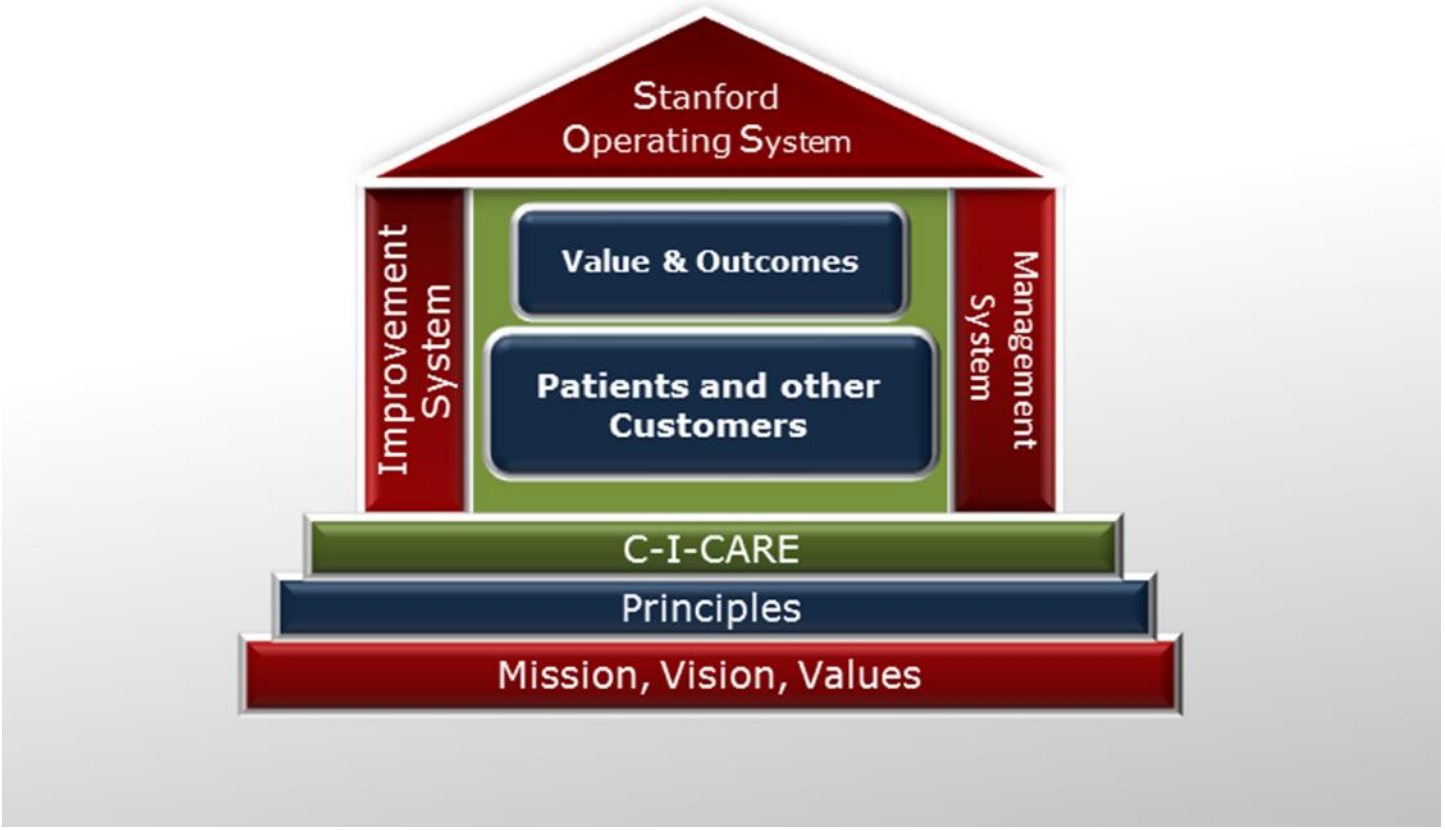
Appendix Q

Cost-Benefit Analysis

	Variables	14- PACs (post-implementation)	14- PACs (annualized)	All HHA & SNF Discharges
	Total Volume	50	150	380
	Readmission Rate	0.2	0.2	0.2
A	Avoid HF readmission	3	12	15.2
B	Average Length of Stay (days)	9	7	7
C	HF Readmission Cost	$ 15,732.00	$ 15,732.00	$ 15,732.00
D	Potential Cost Avoidance (A x C)	$ 47,196.00	$ 188,784.00	$ 239,126.40
E	Potential Bed-days Saved (A x B)	27	84	106
F	Cost of the project	$ 59,040.00	$ 59,040.00	$ 59,040.00
G	Net Saving (D- F)	$ (11,844.00)	$ 129,744.00	$ 180,086.40
	Cost Benefit (G/F)		220%	305%

Appendix R

CQI Method - Lean Methodology Diagram



Add source reference

Appendix S

Data Collection Tools

Descriptive Analysis of Variables

	Measurement	Baseline (FY21)	Post-Implementation (FY23)
Number of Patients		123	50
Age	(mean +/- SD)	75.8 +/- 12.5	78.9 +/- 12.0
	Median Age	77	80
% Male		53%	58%
Insurance Type	Commercial	10%	0%
	Medicare	77%	80%
	Medi-Cal	12%	20%
	Other	1%	0%
Index LOS	Mean Days (+/- SD)	7.1 (+/- 7.5)	9.0 (+/- 9.6)
	Median Days	4	6
Top 3 Diagnosis on Discharge	I13.0- Hypertensive heart and chronic kidney disease with heart failure and stage 1 through stage 4 chronic kidney disease, or unspecified chronic kidney disease	59%	38%
	I11.0- Hypertensive heart disease with heart failure	25%	36%
	I13.2- Hypertensive heart and chronic kidney disease with heart failure and with stage 5 chronic kidney disease, or end stage renal disease	9%	18%
	Other	7%	8%
Discharge Destination	Home Health	72%	82%
	SNF	28%	18%

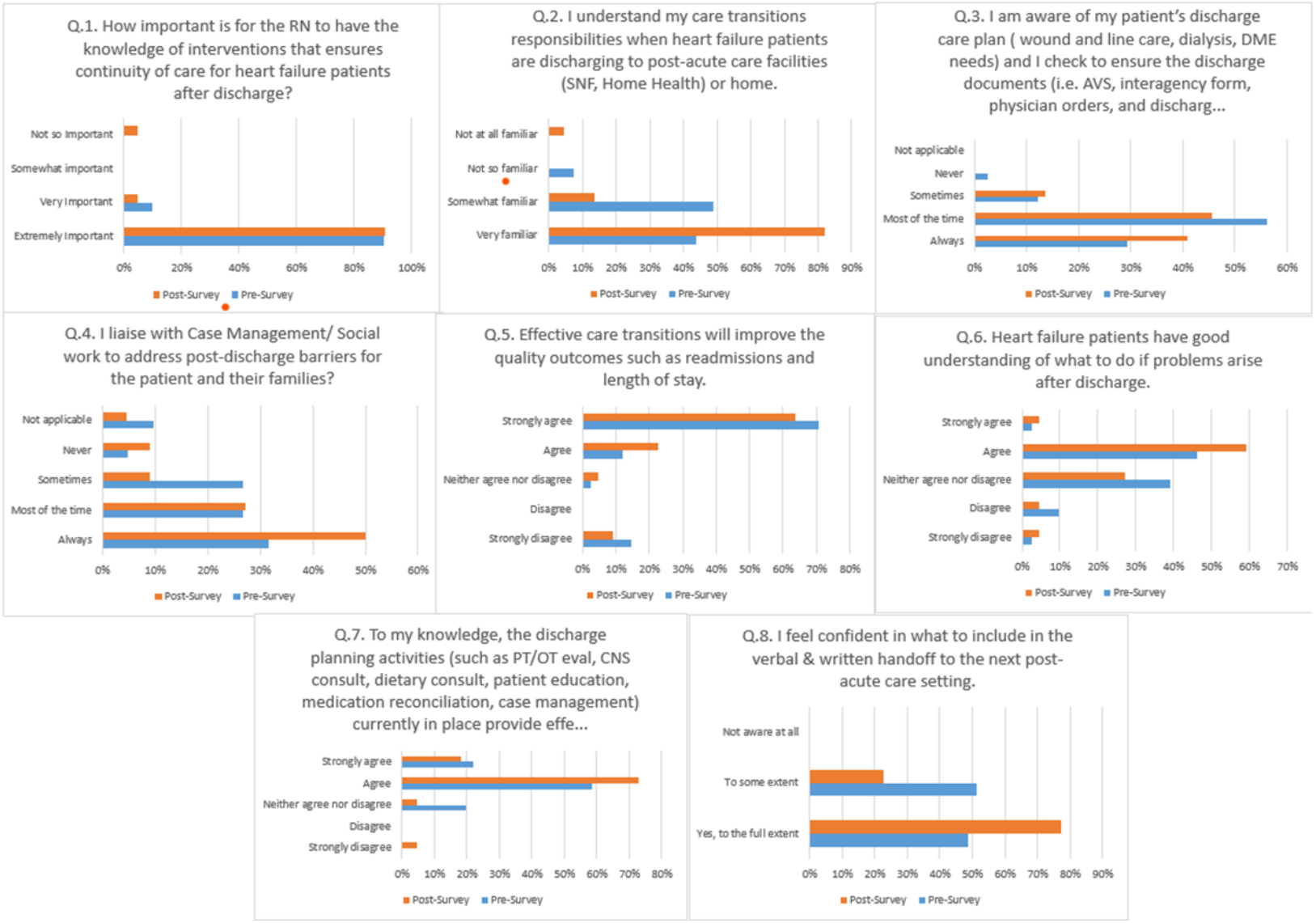
Outcome Measure and Process Measure Outcomes

	Baseline (FY21)	Post-Implementation (FY23)	p-value
30-Day Readmission Rate	25%	20%	0.466
Follow-up Phone Call within 48 hours	90%	96%	
Discharge Appointment within 7 days of Discharge	68%	58%	
Teach-back	85%	94%	
Medication Teaching at Discharge	54%	72%	
Home Health Enrollment within 48 Hours of Inpatient Discharge	N/A	46%	
Home Health Referral Post SNF Discharge	N/A	56%	

Pre- and Post- Intervention Nursing Knowledge Assessment Results

	Pre-Education Assessment	Post-Education Assessment	Unequal variance t test p-value
Questionnaire Total Average Score	80.75	84.39	0.578

Pre- and Post- Intervention Nursing Knowledge Assessment Comparison



Appendix T

Statement of Non-Research Determination

DNP Department Policy on IRBPHS
Approval of DNP Practicum or Project Activity

All research projects conducted by faculty or students at USF require prior approval by the IRBPHS Committee. Refer to USF IRB guidelines (USF Connect) for current procedures regarding application for approval of your research. Any research conducted by students must have faculty support and approval prior to submission of the application to the University IRB Committee. Do not proceed with any type of recruitment, data collection or analysis until you receive written approval from the University IRBPHS Committee.

All DNP Projects must receive approval by the Committee Chair and the Department prior to enrollment in N789/795. Approval forms can be downloaded from the DNP Student Portal.

Quality Improvement, Research and IRBPHS

Quality Improvement is defined as "a systematic pattern of actions that is constantly optimizing productivity, communication, and value within an organization in order to achieve the aim of measuring the attributes, properties, and characteristics of a product/service in the context of the expectations and needs of customers and users of that product". *[Source: The Institute of Medicine]*

- QI projects do not require IRB approval

Research is defined as "a systematic investigation, including research development, testing and evaluation, designed to develop or contribute to generalizable knowledge. Activities which meet this definition constitute research for purposes of this policy, whether or not they are conducted or supported under a program which is considered research for other purposes. For example, some demonstration and service programs may include research activities."
http://www.hhs.gov/ohrp/humansubjects/guidance/45cfr46.html#46.102

- All research involving human subjects requires IRB approval.

DNP Projects might use mixed methods, whereby research activity is combined with QI/ Process improvement. In these cases federal guidelines state "most quality improvement efforts are not research subject to the HHS protection of human subjects regulations. However, in some cases quality improvement activities are designed to accomplish a research purpose as well as the purpose of improving the quality of care and in these cases, the regulations for the protection of subjects in research (45 CFR part 46) may apply. "http://answers.hhs.gov/ohrp/categories/1569

- QI projects that include research activity or potential research activity must have IRB approval.

Definition of Human Subjects

The federal regulation used to define human subjects will be used by DNP faculty, Committee Chairs and the DNP Department to determine whether DNP projects involve research and must have IRB approval.

- DHHS definition - a living individual about whom an investigator conducting research obtains (1) data through intervention or interaction with the individual; or (2) identifiable private information.
    - **Intervention** includes both physical procedures by which data are gathered (e.g., venipuncture) and manipulations of the subject or the subject's environment that are performed for research purposes.
    - **Interaction** includes communication or interpersonal contact between investigator and subject.
    - **Private information** includes information about behavior that occurs in a context in which an individual can reasonably expect that no observation or recording is taking place, and information which has been provided for specific purposes by an individual and which the individual can reasonably expect will not be made public (for example, a medical record). Private information must be individually identifiable (i.e., the identity of the subject is or may readily be ascertained by the investigator or associated with the information) in order for obtaining the information to constitute research involving human subjects.
- FDA definition- an individual who is or becomes a participant in research, either as a recipient of the test article or as a control. A subject may be either a healthy human or a patient.

The following examples are NOT human subjects research and therefore do not normally require IRB approval:

- **Quality Improvement** – Projects aimed at improving local systems of care. The intent is to promote *"betterment"* of a process of care, clinical outcome within the institution.

- **Quality Assessment** – activities that determine whether aspects of medical practice conform to established standards.

- **Quality Assurance** – Process of reviewing, analyzing or evaluating patient or provider specific data that may indicate (the need for) changes in systems or procedures that improve quality of care. The knowledge generated is typically for local, immediate application within the institution.

- **Outcome analysis**: Projects in which medical records are reviewed to evaluate the outcome of medical treatment or the course of patients with a specific medical condition. Results are not compared to an established standard.

- **Resource utilization review**: Medical record review conducted to evaluate the use of resources in a specific health care activity.

- **Public health practice**: e.g., surveillance (monitoring of diseases) and program evaluation (immunization coverage, or clinical preventive services such as mammography).

- **Education**: transferring information from one group of people to another – i.e., teaching somebody something.

- **Evidence-based nursing practice change**: designed to enhance the well-being of a patient or patient population.

IRB Approval Necessary to Publish

IRB approval is not necessary to publish or present QI projects and findings as long as the publication or presentation does not refer to the project as research and makes it clear that the publication is the result of a quality / process improvement activity. The following federal guideline makes this clear and can be disseminated to journals that question this determination.

> • ***"the intent to publish is an insufficient criterion for determining whether a quality improvement activity involves research.*** *Planning to publish an account of a quality improvement project does not necessarily mean that the project fits the definition of research; people seek to publish descriptions of non-research activities for a variety of reasons, if they believe others may be interested in learning about those activities. Conversely, a quality improvement project may involve research even if there is no intent to publish the results."* *http://answers.hhs.gov/ohrp/categories/1569*

IRB Exempt categories:

The following types of research are exempt from IRB approval. ***45_CFR_46.101(b)***

1. Research conducted in established or commonly accepted **educational settings**, involving normal educational practices, such as (i) research on regular and special education instructional strategies, or (ii) research on the effectiveness of or the comparison among instructional techniques, curricula, or classroom management methods.

2. Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures or observation of public behavior, **unless**:

> (i) information obtained is recorded in such a manner that **human subjects can be identified**, directly or through identifiers linked to the subjects; and (ii) any disclosure of the human subjects' responses outside the research could reasonably place the subjects at risk of criminal or civil liability or be damaging to the subjects' financial standing, employability, or reputation.

3. Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures, or observation of public behavior that is not exempt under paragraph (b)(2) of this section, if:
(i) the human subjects are elected or appointed public officials or candidates for public office; or (ii) Federal statute(s) require(s) without exception that the confidentiality of the personally identifiable information will be maintained throughout the research and thereafter.

4.Research involving the collection or study of existing data, documents, records, pathological specimens, or diagnostic specimens, if these sources are publicly available or if the information is recorded by the investigator in such a manner that subjects cannot be identified, directly or through identifiers linked to the subjects.

5. Research and demonstration projects which are conducted by or subject to the approval of Department

or Agency heads, and which are designed to study, evaluate, or otherwise examine:
(i) Public benefit or service programs; (ii) procedures for obtaining benefits or services under those programs; (iii) possible changes in or alternatives to those programs or procedures; or (iv) possible changes in methods or levels of payment for benefits or services under those programs.

6. Taste and food quality evaluation and consumer acceptance studies, (i) if wholesome foods without additives are consumed or (ii) if a food is consumed that contains a food ingredient at or below the level and for a use found to be safe, or agricultural chemical or environmental contaminant at or below the level found to be safe, by the Food and Drug Administration or approved by the Environmental Protection Agency or the Food Safety and Inspection Service of the U.S. Department of Agriculture.

Please ensure that you have completed the Statement of Non-research Determination and provided that document to your Chair/Advisor. The document can be found on the DNP portal.

Doctor of Nursing Practice
Statement of Non-Research Determination (SOD) Form

The SOD should be completed in NURS 7005 and NURS 791E/P or NURS 749/A/E

General Information

Last Name:	Krishna	**First Name:**	Purnima
CWID Number:	20626933	**Semester/Year:**	ELDNP Fall - 2021
Course Name & Number:	NURS-791 E Practicum II: Micro-Systems		
Chairperson Name:	Dr. Elena Capella	**Advisor Name:**	Dr. Elena Capella

Project Description

1. ***Title of Project:***

Improving the Continuum of Care of Heart Failure Patients Through Post-Acute Care Collaboration

2. ***Brief Description of Project***

Clearly state the purpose of the project and the problem statement in 250 words or less.

Patients with heart failure (HF) have a high risk of rehospitalization after discharge from the acute care setting. For the Centers of Medicare & Medicaid Services (CMS), 30-day readmission reduction is a high priority. Reducing readmissions is a critical quality indicator and adds billions of dollars of expense to Medicare annually (CMS Office of Minority Health, 2020). The prevalence of HF is projected to increase by 46% from 2012 to 2030, accounting for more than eight million people over the age of 18 years (Virani et al., 2021). The latest projections from the heart disease and stroke statistics report are that the total cost of HF will increase to $69.8 billion by 2030, a 127% increase from 2012 (Virani et al., 2021).

The use of post-acute care services, primarily skilled nursing facilities and home health agencies, has increased in the last decade to support the complex needs after discharge from the hospital. At the DNP student's organization, the 30-day readmission rate of HF patients has been increasing for the last four years. The readmission rate reached 20% in 2019, which has been the highest in ten years. Further data analysis showed that HF patients discharging to skilled nursing facilities and home health agencies have higher readmission rates: 21.4% and 19.5%, respectively. Currently, there is no strategy in place to build formal collaboration with the PACs. The project aims to examine the impact of collaboration among hospital and PACs on 30-day readmissions for heart failure patients.

3. AIM Statement: What are you trying to accomplish?

- What do you hope to accomplish with this project? Aims should be SMART, specific, clear, well-defined, and at a minimum describe the target population, the desired improvement, and the targeted timeframe.
- To improve (your process) from (baseline)% to (target)%, by (timeframe), among (your specific population)

To reduce 30-day readmissions of heart failure patients discharged with skilled nursing and home health services from 20.5% to 16.4% (20% reduction) by December 2022.

4. Brief Description of Intervention (150 words).

Evidence suggests that multidisciplinary management of heart failure patients and high-impact transitional care interventions significantly impact HF 30-day readmissions. The intervention will include collaboration between the hospital and the selected PACs and implementing the evidence-based HF care pathway to address the transition of care gaps. The multi-level theoretical framework will be used to establish an inter-organization care coordination network (Van Houdt et al., 2013). The project will include current state mapping of the mechanisms to identify the gaps and design future state care pathway.

The key interventions will include inter-organization feedback mechanism, post-discharge follow-up, information sharing, clinician handoffs for high-risk patients, and escalation protocols. The 30-day readmissions of HF patients discharging to SNF and HH are the primary outcome measure. The secondary outcome measures are the length of stay at the hospital and pre-and post-survey of HF task force members to evaluate satisfaction and effectiveness of collaboration.

4.a *How will this intervention be implemented?*

- Where will you implement the project?
- Attach a letter from the agency with the approval of your project.
- Who is the focus of the intervention?
- How will you inform stakeholders/participants about the project and the intervention?

The project will be implemented at the DNP student's organization, Stanford Health Care, and a post-acute care health system that includes three skilled nursing facilities and a home health agency. The interventions will be focused on the patients with a primary diagnosis of heart failure discharging to the selected skilled nursing facilities and home health agency. The project is approved by the cardiovascular service line and care coordination leadership. Also, the Chief Quality Officer has provided the letter of support for this DNP project (See Appendix). Currently, the intra-organizational mechanisms, such as structure, knowledge & technology, and task characteristics exists in each organization in silos. Although, both the hospital and the PACs have interests in reducing the readmissions for HF patients, the efforts are not coordinated between the organization.

For this project, the DNP student is leading a HF task force that includes following members: Director of CVH Clinical Operations, Manager of HF Clinic, HF Advanced Practice

Provider (APP), HF Clinical Nurse Specialist (CNS), Executive Director of Clinical Support Services, and Manager of Care Coordination. The HF task force meets biweekly to work on the project planning and deliverables. Additionally, the DNP student has established monthly check-in meetings with the sponsors to update the progress of the project. The HF data analysis has identified top 10 PACs with high number of HF referrals. This would ensure the impact of interventions on large group of patients going to these PACs. The HF task force has completed the interviews with the leadership of these 10 PACs to assess their readiness for collaboration. For the DNP project, the number of facilities has been narrowed down to include a PAC health system that has strong leadership support and basic infrastructure to support HF program at their facility.

5. *Outcome measurements: How will you know that a change is an improvement?*

- Measurement over time is essential to QI. Measures can be outcome, process, or balancing measures. Baseline or benchmark data are needed to show improvement.
- Align your measure with your problem statement and aim.
- Try to define your measure as a numerator/denominator.
    - What is the reliability and validity of the measure? Provide any tools that you will use as appendices.
    - Describe how you will protect participant confidentiality.

The key performance indicators are:

a) 30-day readmissions rate of heart failure patients discharging to SNF & HH
b) Hospital length of stay (in days) of heart failure patients discharged to SNF & HH
c) Pre and post-survey of HF task force members to evaluate satisfaction and effectiveness of collaboration
d) Percentage of hospital post-discharge follow-up phone calls completed for heart failure patients discharged to SNF & HH. The current standard is to complete discharge follow-up with 48 hrs on every HF discharge regardless of discharge disposition. This metric is to ensure that the standard is met consistently for patients discharged to PACs as well.
e) Rate of heart failure patients assessed by the HH agencies within 48 hrs of discharge. The Medicare Part A requires home health agency to conduct initial visit within 48 hours of referral.
f) Percentage of heart failure patients receiving HH services post SNF discharge.

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DNP Statement of Determination

Evidence-Based Change of Practice Project Checklist*

The SOD should be completed in NURS 7005 and NURS 791E/P or NURS 749/A/E

Project Title:

Improving Continuum of Care of Heart Failure Patients Through Post-Acute Care Collaboration

Mark an "X" under "Yes" or "No" for each of the following statements:	Yes	No
The aim of the project is to improve the process or delivery of care with established/ accepted standards, or to implement evidence-based change. There is no intention of using the data for research purposes.	X	
The specific aim is to improve performance on a specific service or program and **is a part of usual care**. All participants will receive standard of care.	X	
The project is **not** designed to follow a research design, e.g., hypothesis testing or group comparison, randomization, control groups, prospective comparison groups, cross-sectional, case control). The project does **not** follow a protocol that overrides clinical decision-making.	X	
The project involves implementation of established and tested quality standards and/or systematic monitoring, assessment or evaluation of the organization to ensure that existing quality standards are being met. The project does **not** develop paradigms or untested methods or new untested standards.	X	
The project involves implementation of care practices and interventions that are consensus-based or evidence-based. The project does **not** seek to test an intervention that is beyond current science and experience.	X	
The project is conducted by staff where the project will take place and involves staff who are working at an agency that has an agreement with USF SONHP.	X	
The project has **no** funding from federal agencies or research-focused organizations and is not receiving funding for implementation research.	X	
The agency or clinical practice unit agrees that this is a project that will be implemented to improve the process or delivery of care, i.e., **not** a personal research project that is dependent upon the voluntary participation of colleagues, students and/ or patients.	X	
If there is an intent to, or possibility of publishing your work, you and supervising faculty and the agency oversight committee are comfortable with the following statement in your methods section: *"This project was undertaken as an Evidence-based change of practice project at X hospital or agency and as such was not formally supervised by the Institutional Review Board."*	X	

Answer Key:

- If the answer to all of these items is "Yes", the project can be considered an evidence-based activity that does not meet the definition of research. IRB review is not required. Keep a copy of this checklist in your files.
- If the answer to any of these questions is "No", you must submit for IRB approval.

*Adapted with permission of Elizabeth L. Hohmann, MD, Director and Chair, Partners Human Research Committee, Partners Health System, Boston, MA.

To qualify as an Evidence-based Change in Practice Project, rather than a Research Project, the criteria outlined in federal guidelines will be used: http://answers.hhs.gov/ohrp/categories/1569

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DNP Statement of Determination
Evidence-Based Change of Practice Project Checklist Outcome

The SOD should be completed in NURS 7005 and NURS 791E/P or NURS 749/A/E

Project Title:

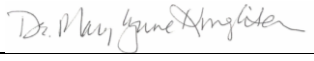
Improving the Continuum of Care of Heart Failure Patients Through Post-Acute Care Collaboration

☑ This project meets the guidelines for an Evidence-based Change in Practice Project as outlined in the Project Checklist (attached). **Student may proceed with implementation.**

☐ This project involves research with human subjects and **must be submitted for IRB approval before project activity can commence.**

Comments:

This is clearly a quality improvement project, and one that is very necessary. The rate of heart failure readmissions has not yet been controlled adequately as an industry standard, although some interventions have been somewhat helpful. Creating a systems level process that occurs in the macrosystem of acute hospital to post-acute services using a multi-level framework is a worthy endeavor. Dr. Knighten

Student Last Name:	Krishna	**Student First Name:**	Purnima
CWID Number:	20626933	**Semester/ Year:**	ELDNP- Fall 2021
Student Signature:	Purnima Krishna	**Date:**	10.2.2021
Chairperson Name:	Elena Capella		
Chairperson Signature:		**Date:**	03/01/22
DNP SOD Review Committee Member Name:	Dr. Mary Lynne Knighten		
DNP SOD Review Committee Member Signature:		**Date:**	3/2/2022

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Appendix U

Collaborative Institutional Training Initiative Certificate

CITI PROGRAM

Completion Date 29-Jul-2021
Expiration Date 28-Jul-2024
Record ID 43786671

This is to certify that:

Purnima Krishna

Has completed the following CITI Program course:

Not valid for renewal of certification through CME.

Human Subjects Research (HSR)
(Curriculum Group)
Human Subjects Research (HSR)
(Course Learner Group)
1 - Basic Course
(Stage)

Under requirements set by:

University of San Francisco

CITI
Collaborative Institutional Training Initiative

Verify at www.citiprogram.org/verify/?w69365bae-5273-4b29-b7ae-3dadbbc731a0-43786671