Implementation and Evaluation of an Inpatient CHF Quality Indicator Electronic
Medical Record Checklist and Alert System

By Melissa M. Kestler

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By

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Dedication

This work is dedicated to my grandmother, Marie Gaard, and to my husband's grandmother, Jane Giles. These were both very strong women with the misfortune to have experienced heart failure in their last years. This project is also dedicated to the heart failure patients treated at Peninsula Regional Medical Center in Salisbury, Maryland, who deserve the best quality of care available.

Acknowledgments

I would like to express my sincere appreciation for everyone who helped me develop, implement, and evaluate this DNP project. This is especially true for my committee chair, Dr. Lisa Seldomridge. She has provided invaluable counsel and words of encouragement at every step of this process. In addition, Dr. Kathryn Fiddler provided opportunities for additional learning from the Population Health perspective outside of my comfort zone of inpatient, acute care, and her unfailing support helped make this project possible. I would also like to thank Dr. Aaron Sebach for his friendship and encouragement along the way. I appreciate the timely advice and feedback he provided as a practitioner, educator, and friend. I know, without a doubt, that I had the best possible committee for this particular project.

In addition, I would like to thank my husband, Jeff, and my two daughters, Mikayla and Susie, for endlessly supporting me throughout this journey. They consistently lifted me up when I was frustrated or discouraged and enabled me to push through in seeing this project to fruition.   I have also had amazing support from both my mother and my in-laws throughout this journey. They believed in my ability to do this, even before I did. My mother has always demonstrated that hard work and dedication will pay off, and I hope I am demonstrating this to my daughters as well.

Abstract

Problem Statement: Over six million Americans have a heart failure diagnosis and are likely to be hospitalized, with each admission costing between $14,000 and $30,000. At Peninsula Regional Medical Center (PRMC), 19% of all patients admitted in 2018 with heart failure exacerbation were readmitted to the hospital with another event within 30 days of discharge. For the Peninsula Inpatient Providers, this number was even higher at a 20% readmission rate. **Purpose:** To implement Basoor's Discharge Checklist within the EMR to improve hospitalist providers adherence to discharge clinical guidelines for medication usage, education, and follow-up services for heart failure patients and reduce 30-day readmission rates. **Methods:** A quasi-experimental pre-post design was used to compare provider adherence with clinical guidelines for ACEI/ARB prescription at discharge, 2-D echocardiogram completion during a hospital stay, and cardiology appointments made prior to hospital discharge before and after implementation of an evidence-based heart failure checklist and alert system within the EMR. **Results:** Of the 193 patients meeting eligibility criteria during the 2-month implementation period, providers used the Basoor Discharge Checklist in some form for 15% (n = 29). A chi-square test of independence confirmed a relationship between the prescription of ACEI/ARB medications at discharge and utilization of the Basoor Discharge Checklist ($\chi^2(4) = 9.82$, $p = .044$). **Significance:** Implementation of the checklist over a two-month time period demonstrated increased rates of ACEI/ARB prescription at discharge. Additional research is necessary to determine impacts on 2-D echocardiogram completion, cardiology appointments, and 30-day readmission rates.

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Project Overview

In the United States, almost 6 million adults are living with heart failure (Centers

for Disease Control and Prevention [CDC], 2016). Unfortunately, approximately 50% of

individuals diagnosed with heart failure (HF) will die within five years of their diagnosis

(CDC, 2016). The American Heart Association (AHA) recognizes several distinct types

of heart failure. Left- sided HF includes both systolic and diastolic HF. Systolic HF

occurs when the left ventricle no longer pumps normally and results in a reduced ejection

fraction (AHA, 2017). Diastolic HF retains a normal ejection fraction and occurs during

diastole when the left ventricle becomes stiff and does not fully relax (AHA, 2017).

Symptoms of left-sided HF occur due to fluid back- up into the lungs and feelings of

fatigue and increasing shortness of breath, especially when lying flat (AHA, 2017).

Right-sided HF often occurs as a result of left-sided HF and results in blood back- up into

the veins, leading to swelling in the feet, ankles, and legs (AHA, 2017). Congestive HF

occurs when fluid backs up into both the lungs and the tissues and can cause pulmonary

edema and impair the kidneys' ability to remove sodium and water, resulting in edema

(AHA, 2017).

Heart failure is a topic of national concern and is costly to treat. The United States

spends over $30 billion each year in HF services, medications, and missed days of work

(CDC, 2016). Additionally, each hospital admission for HF costs over $14,000 and is

compounded due to an average 22% 30-day readmission rate (Kilgore, Patel, Kiehlhorn,

Maya, & Sharma, 2016). This is also true at Peninsula Regional Medical Center (PRMC)

where, in 2018, 27% of all patients admitted from January through September with HF

exacerbation were readmitted to the hospital with another exacerbation event within 30 days of discharge (C. Eiseman, personal communication, October 12, 2018). This represents a dramatic increase over the 16% readmission rate reported in 2017 (C. Eiseman, personal communication, October 12, 2018). Accordingly, PRMC's Population Health division has made continuity of care between outpatient offices and the inpatient setting a priority.

This project bridged the gap between both settings through the implemention and evaluation of a heart failure electronic medical record (EMR) checklist and alert system completed by the Peninsula Inpatient Providers (PIPs). By implementing Basoor's discharge checklist (Appendix B) within the EMR, hospitalist providers ensured that patients admitted with HF were discharged from the hospital with the appropriate medications, education, and follow-up services necessary to successfully manage their disease outside of the hospital setting (Basoor, Doshi, Cotant, Saleh, Todorov, Choksi, et al., 2013). Bedside nurses at PRMC assisted providers by providing and documenting evidence-based HF education throughout a patient's stay.

Problem Statement

The costs of HF are staggering. Between the financial burden of disease, years of life lost to disability, and mortality rates associated with HF, it is increasingly important to transition each patient effectively from the inpatient setting to the primary care setting. Data collection in spring, 2018 from one of the internal medicine practices associated with the PRMC Accountable Care Organization (ACO) revealed that this level of transition was not occurring. Medicare patients were not having 2-D echocardiograms

completed, proper HF medications prescribed, or cardiology appointments made while in the outpatient setting (Kestler, 2018). The opportunity to improve the discharge process by the inpatient providers at PRMC helped provide assurance that each patient admitted for a HF exacerbation would leave the hospital with these measures in place prior to discharge in order to help reduce the 30-day readmission rate.

Purpose of Project

The purpose of this project was to incorporate the Basoor discharge checklist into the EMR and to guide the PIPs in ensuring HF patients had a 2-D echocardiogram, an angiotensin-converting-enzyme inhibitor (ACEI) or angiotensin II receptor blocker (ARB) prescribed, and an appointment with cardiology made prior to discharge from the hospital. In addition, ongoing HF education for patients provided by the nursing staff, reinforced the importance of taking medication, modifying diet, and controlling comorbidities once they returned home.

Clinical Question

The clinical question investigated with this DNP project was: In non-pregnant adults over the age of 18 who have a diagnosis of CHF admitted to PRMC with CHF exacerbation, does implementation of a CHF quality indicator EMR checklist and alert system by PIPs decrease the 30-day readmission rates for HF-related diagnosis and increase the rates of ACEI/ARB prescription compliance, inpatient 2-D echocardiogram completion rates, and cardiology follow up appointments made at the time of discharge over a two-month time period?

Review of Literature

Literature Search

A systematic review of literature was conducted by searching the databases accessible through the Salisbury University libraries. This included Medline, CINAHL, Allied Health, and ProQuest Nursing databases. This search included peer-reviewed articles from January 2011 through October 2018. Search terms included the following: HF discharge checklists, EMR HF discharge checklists, Basoor's discharge checklist for HF, inpatient education for HF, decreasing HF readmissions, and provider education for HF. There were no age or gender filters applied to the initial searches. There were 432 articles meeting this search criteria and another 10 articles were identified through other sources. After the removal of duplicates, 98 articles remained for consideration. Abstract review of the 98 articles led to the exclusion of 78 and 20 articles underwent a full review. Excluded from final literature review were those articles that did not use a checklist at discharge or utilized evidence-based patient education, resulting in a total of nine articles for final review (See PRISMA diagram, Appendix C).

Synthesis

The process of discharging HF patients back to the community needed to be comprehensive and consistent to reduce the likelihood of readmission within 30 days. The use of a discharge checklist, either on paper or in the EMR, helped reduce the HF readmission rate and provided better patient outcomes. These checklists included patient education, medication management, and guidelines for follow-up (Abdallah, et al., 2017; Basoor, et al., 2013; Frederick, et al., 2016). Assisting providers to adhere to current HF

guidelines was an important part of inpatient HF management (Punnanithinont, Kairouz, Diaz Del Carpio, & Page, 2018; Chua, et al., 2018). Part of this comprehensive process was the need for consistent in-patient education prior to discharge to increase health literacy and help patients understand the interventions to keep them out of the hospital (Arthur, et al., 2015; Boyde, et al., 2013; DeWalt, et al., 2012). These results can be found in Appendix A.

Use of a Discharge Checklist

Four studies identified use of a checklist at the time of discharge as a way to prevent HF readmissions. Basoor, et al. (2013) utilized a 27-item paper checklist on each HF patient's chart in a randomized control trial to determine if patients received the proper medication, interventions and education, and follow-up services arranged prior to discharge. Checklist use resulted in significant reductions in both 30-day (19%; N= 9 of 48 to 6%; N= 3 of 48) and six-month readmission rates (42%; N= 20 of 48 to 23%; N= 11 of 48). Frederick, et al., (2016) utilized a checklist for over 5,000 patients and were able to decrease the 30-day readmission rate by three percent. Their checklist followed Heart Failure Society of America (HFSA) recommendations for medication prescription, patient education, and follow-up appointments (Frederick, et.al., 2016). In another study, Abdallah, et al. (2017) sought to reduce the 30-day HF readmission rate to less than 20% through the use of a discharge checklist placed in the EMR which included a hard stop, ensuring provider adherence to the process. The provider could not continue with the discharge process without completing the discharge checklist, which included medication reconciliation, patient education, and follow up care. Readmission rates were reduced

from 24.8% to 18.9%. In another quality improvement initiative, Lewis, Cox, and

Lenihan (2014) used a discharge tool in the EMR to help providers identify that HF

initiatives were not missed. This project focused more on whether the data were

completed instead of decreased readmission rates.

Inpatient Provider Adherence

Punnanithinont, Kairouz, Diaz Del Carpio, and Page (2018) decreased hospital

readmissions by almost half (47%; N= 16 of 34 to 24%; N= 8 of 34) through a quality

improvement project which used an inpatient checklist to assist providers adherence to

current HF guidelines through the use of an inpatient checklist. The checklist used with

their inpatient providers included prescription of medications according to HF guidelines,

education provided by a dedicated nurse practitioner, physical therapy evaluation, and

scheduled follow-up appointments given at the time of discharge (Punnanithinont,

Kairouz, Diaz Del Carpio, & Page, 2018). Similarly, Chua, et al. (2018) increased the

compliance rate of ACEI/ARB prescription compliance from 60% to 90% over a two-

year period by providing structured provider education for three months prior to the start

of data collection.

Consistent Patient Education

In a randomized controlled trial, DeWalt, et al. (2012) determined the importance

of multiple educational sessions for patients with low health literacy when compared to a

single educational session. Although there was no statistically significant improvement in

outcomes, patients did demonstrate an increase in their knowledge of HF. Arthur, et al.

(2015) demonstrated that increased adherence to structured inpatient education sessions

also decreased HF readmissions. By providing 60 minutes of education prior to discharge, HF readmissions decreased from 29% to 19% over a two-year time period. Boyde, et al. (2013) used a pre- and post-test design to show that providing structured education also increased self-care knowledge for those participants who completed the education sessions the Dutch Heart Failure Knowledge Scale and the Self-Care of Heart Failure Index to assess knowledge and self-care. By providing multimedia, HF-specific education, the healthcare professionals improved these participants' HF literacy as well as their ability to care for their disease (Boyde, et al., 2013).

Summary of Evidence

Overall, the literature demonstrates that hospital readmissions can be reduced with comprehensive, consistent inpatient HF management and primary care provider follow up. The use of a discharge checklist has been shown to be effective in determining if patients had the appropriate medications prescribed, education provided, and outpatient services scheduled prior to leaving the hospital. For improved consistency, reminders and education for providers assisted in adherence to current HF guidelines. Patients with HF require structured, recurring education to assist with self-care.

<div align="center">Theoretical Framework</div>

Conceptual Framework

This DNP project was guided by the theoretical framework defined by the Donabedian Model that focused on the categories of structure, process, and outcome (Moran, Burson, & Conrad, 2017. These categories will be briefly defined and discussed

as related to the implementation and evaluation of a CHF quality indicator checklist prior to discharge.

1) Project Structure: this is the setting in which the project will be implemented (Moran, Burson, & Conrad, 2017). For this DNP project, the setting included the following:

    a) Peninsula Regional Medical Center: a regional hospital in Salisbury, Maryland.

    b) Peninsula Inpatient Providers: physicians, nurse practitioners, and physician assistants within the PIPs group.

    c) Inclusion Criteria: non-pregnant adults over the age of 18 admitted to PRMC who had HF on their problem list in the EMR or were admitted with a HF exacerbation

2) Process: this defined how the project was completed and what was done (Moran, Burson, & Conrad, 2017).

    a) Prior to project implementation, Institutional Review Board (IRB)approval was obtained from Salisbury University and PRMC's Research Review Council

    b) Reminded the PIPs that the Basoor Discharge Checklist would be implemented within the EMR on HF patients at discharge

    c) Reinforced the importance of documentation in 15-minute educational sessions with nursing staff

    d) Ran weekly reports for those patients where the Basoor Discharge Checklist was utilized

    e) Reviewed individual charts of HF patients to determine how many times the patient had been admitted to the hospital within the past 30 days, whether an ACEI/ARB was prescribed on discharge, the patient received a 2-D

echocardiogram while in the hospital, and whether cardiology appointments were

made at discharge

3) Outcome: the outcome is the part of the project that was measured, reviewed, and

assessed (Moran, Burson, & Conrad, 2017).

a) The number of patients with HF who were discharged from PRMC after use of

the Basoor checklist is implemented

b) The number of patients who were readmitted to the hospital within 30 days with a

HF diagnosis, rates of ACEI/ARB compliance, inpatient 2-D echocardiogram

completion rates, and number of patients who had cardiology appointments made

prior to discharge

The Evidence Based Practice Model for Change

For this project, an evidence-based practice (EBP) model guided the

methodology. Specifically, the Plan-Do-Study-Act (PDSA) Cycle was utilized (Institute

for Healthcare Improvement, n.d.). This cycle was an effective way to test change in the

healthcare environment, determine whether a change was effective, and evaluate the

impact it had on the healthcare environment (Institute for Healthcare Improvement, n.d.).

The steps in this process as applied to the implementation of a CHF quality indicator

checklist prior to discharge included the following:

1. Plan: state the objectives being tested, make predictions about what will happen

during the test, and develop a plan to test the change (Institute for Healthcare

Improvement n.d.)

- Objectives: to reduce 30-day CHF admissions by utilizing the Basoor discharge checklist prior to discharge

- Prediction: CHF readmissions for the PIPs will decreased to less than 20% after implementation

- Plan: implement a paper Basoor discharge checklist for patients admitted with CHF exacerbation to the PIPs prior to discharge, including education already provided by the nursing staff to inpatient CHF patients

2. Do: during this step, a small-scale change was initiated to determine whether it was feasible for widespread implementation. During the test, unexpected problems were documented and data were analyzed (Institute for Healthcare Improvement, n.d.)

- The Basoor discharge checklist was implemented with the PIPs group for patients who had HF on their EMR problem list or were admitted with HF exacerbation. This process has potential to be adapted for other chronic conditions in the future if it is successful in reducing hospital readmissions in the CHF population

3. Study: according to the Institute for Healthcare Improvement, it was important to set aside dedicated time to analyze the data and determine the results of the test (n.d.)

- Evaluating the results of the implementation phase occurred in January 2019. At this time, it was determined what parts of the process worked well and what needed improvement

4. Act: once evaluated, it was important to determine which lessons were learned

    through implementation and how to improve the original plan for the future (Institute

    for Healthcare Improvement, n.d.).

- Suggested modifications to the study design were presented to the executive

    staff at PRMC

<div align="center">Methodology</div>

Project Design

This quality improvement project implemented and evaluated the use of a HF

EMR checklist by the PIPs during the discharge process of patients admitted to PRMC

for a HF exacerbation. This included data collection from two separate groups of

inpatients at PRMC. Retrospective baseline data were gathered from non-pregnant adults

over the age of 18 who were admitted by the PIPs. Data gathered on those previously

defined patients admitted with a diagnosis of HF exacerbation at PRMC from the dates of

November 1, 2017 through December 31, 2017 included the following: 30-day

readmission rates for a HF-related diagnosis, compliance with prescription of ACEI and

ARB medications prescribed at discharge, 2-D echocardiogram completion rates, and

cardiology follow-up appointments made by the time of patient discharge.

Then, using the PDSA Cycle, prospective observational data were gathered on

non-pregnant adults over the age of 18 who were admitted to the Peninsula Inpatient

Provider group with a diagnosis of HF exacerbation at PRMC from November 1, 2018

through December 31, 2018 where the CHF quality indicator EMR checklist and alert

system was utilized within the discharge process. This included 30-day readmission rates

for a HF-related diagnosis, compliance with prescription of ACEI and ARB medications, 2-D echocardiogram completion rates, and cardiology follow-up appointments made by the time of patient discharge.

IRB and Agency Approval

Prior to beginning this quality improvement project, IRB approval was obtained from Salisbury University, Peninsula Regional Medical Center's Research Review Council and the Western Institutional Review Board (WIRB). All DNP committee members who might have access to the data gathered in this quality improvement project completed the National Institutes of Health (NIH) online Human Protection's Training and/or Collaborative Institutional Training Initiative (CITI) training prior to beginning data collection.

Participants

The proposed population for inclusion in both sets of data collection included all non-pregnant adult patients, over the age of 18, who were admitted as inpatients to the Peninsula Inpatient Provider group for HF exacerbation during the specified time periods. Excluded from data collection were children under the age of 18, pregnant women, and patients admitted to providers other than the ones listed.

Procedures

Data collection began on November 1, 2018 and continued through December 31, 2018. Data were collected using the data collection tool (Appendix G). Prior to implementation of the Basoor's HF Checklist by PIPs, the Chief Medical Information Officer at PRMC integrated the Basoor HF Checklist within the EMR. He designed the

checklist to populate on all patients with CHF on their problem list and discharged by the PIPs. The Basoor Discharge Checklist was integrated directly into the discharge note, where the provider was required to answer questions related to medications, education, and discharge appointments.

Bedside nurses were encouraged to document on the section of the checklist "Interventions and Counseling Measures Addressed" as they provided CHF education to their patients, utilizing the 15-minute sessions outlined in Jennifer Hart's Salisbury University DNP project, "Improving Inpatient Education and Follow-up in Patients with Heart Failure" (2018) which received Salisbury University IRB and PRMC Research Council approval in summer 2017 (Appendix F). These educational sessions were already utilized at PRMC and aligned with the Basoor's Heart Failure Checklist, but a brief reminder was provided to bedside nursing personnel on the inpatient cardiac unit at their November staff meeting to document completed teaching in the EMR. In addition, two of the PIPs- Dr. Aaron Sebach, a senior nurse practitioner and Dr. Aisha Batool- presented the practice change during the October 2018 staff meeting. The Chief of Medicine also presented the practice change during the October Department of Medicine meeting. Both of these meetings were attended by PIPs. After November 1, 2018, the PIPs began completing the Basoor's Heart Failure Checklist for patients discharged who met the inclusion criteria previously described. Once completed, the discharge checklist remained within the patient's discharge summary as part of the EMR. A report was designed to allow the DNP student to know which patients generated the Basoor Discharge Checklist

after which the DNP student manually collected data from the individual patient medical records.

At the end of the two-month time period, data were collected to help evaluate whether there was a reduction in 30-day readmissions for a CHF related diagnosis, increased rates of compliance with medication prescription and completion of 2-D echocardiograms, and increased rates of cardiology follow-up appointments made at discharge when compared to the same time frame in 2017. Data were analyzed using Intellectus Statistics[TM] to determine whether differences existed between the comparison groups of patients, and if so, whether the differences were statistically significant.

Setting and Organizational System Analysis (SWOT)

This quality improvement project took place at PRMC in Salisbury, Maryland. In 2018, PRMC was named a "Best Regional Hospital" by the U.S. News for demonstrating excellence in the care of HF, colon cancer surgery, and hip replacement surgery patients (Peninsula Regional Medical Center, 2018). One of the strengths of this hospital was that it continues to be on the cutting edge of the use of technology in patient care. For the eighth consecutive year, PRMC was named among the nation's "Most Wired" (Peninsula Regional Medical Center, 2018).

Accordingly, the checklist chosen for implementation of this project was implemented within the EMR Epic. This ensured that the PIPs addressed all HF metrics appropriate for patients at discharge. In addition, there was a high level of executive staff engagement from the Population Health Department, Information Services, as well as the PIPs. Other strengths of this project included an established, consistent method of

offering HF education with support from the bedside nursing staff. External factors that provided opportunities for this project included support from the ACO associated with PRMC and the urgency created by Medicare policies to decrease the number of 30-day readmissions for HF patients.

Moreover, the EMR software Epic was integrated across multiple local primary care practices and cardiology practices to help ensure continuity of care upon hospital discharge. Also, as the PIPs provided the majority of inpatient care for those admitted with HF to PRMC, consistency around discharge practices of HF patients was expected.

Some internal factors that created weaknesses for this project included the potential for inconsistent documentation in the EMR related to the HF measures being evaluated. Contributing factors for inconsistencies were related to a high inpatient census for the PIPs. In addition, there was not a specified process to identify specific inpatient units to which HF patients would be admitted. Patients with a HF diagnosis had the potential to be admitted to one of 12 different inpatient units, allowing for potential inconsistencies in education and care delivery. External threats that could potentially impact this project included competing priorities within the organization (Appendix D).

Implementation Timeline

June 2018- September 2018

- Conducted a comprehensive literature review and SWOT analysis
- Met with Dr. Fahad bin Nayim, Hospitalist and Chairman, Department of Medicine regarding a plan for implementation and EMR checklist development

- Met with Dr. Mark Weisman, Chief Medical Information Officer, regarding EMR implementation

- Contacted the Research Review Council for IRB submission process

- Obtained a letter of commitment from PRMC for project implementation

- Submitted IRB application to Salisbury University Committee on Human Research

October 2018- December 2018

- Submitted project to PRMC Research Review Council for approval

- Began implementation of Basoor discharge checklist on November 1, 2018

- Collected baseline data from 2017 admissions

- Conducted statistical analysis

January 2019- May 2019

- Project evaluated

- Disseminated project findings to the PIPs, Population Health Division, and Research Review Council at PRMC

- Recommended changes to both PIPs and the Population Health Division

- Completed formal DNP Project Paper

- Prepared a submission-ready manuscript

- Completed DNP project presentation at Salisbury University

Ethical Concerns

As a quality improvement project, there were minimal risks involved in the project design and data collection process. The primary risk to patients was related to privacy or confidentiality of their health data. In addition to Salisbury University's IRB approval, the DNP student also received approval from PRMC's Research Review Council, in cooperation with the WIRB. This resulted in a collaboration agreement with PRMC (Appendix D). To compare descriptive statistics, the DNP student accessed personal health information (PHI) of individuals whose data was collected throughout this project. The DNP student complied with the data use agreement required by PRMC as well as with all Health Insurance Portability and Accountability Act (HIPAA) and Health Information Technology for Economic and Clinical Health Act (HITECH) laws. To minimize risk to patients, data were de-identified before being placed in a data collection log by the DNP student. Any data stored on the DNP student's personal computer were placed in the de-identified data collection log. This was collected and stored in an Excel spreadsheet on the DNP student's password-protected personal computer and will remain there for a maximum of five years per the American Psychological Association (APA) guidelines to allow for dissemination of findings and then will permanently destroyed. The use of the CHF quality indicator EMR checklist and alert system did not prevent any patient from receiving the same care received prior to the use of the CHF quality indicator EMR.

Project Implementation

Barriers and Facilitators

There have been both organizational and individual barriers to the implementation of this project at PRMC. One of the main barriers was communication around the process for submission to the RRC at PRMC for consideration. The RRC recently implemented a new process to enable DNP students to conduct projects at PRMC. This project was one of the first to benefit from the new process. Nonetheless, there were a few challenges in navigating the new process, primarily influenced by recent staffing changes in the department. Additionally, Salisbury University faculty received no communication directly from the RRC which facilitated confusion around the submission process, delays starting the project, and limited the amount of time available for data collection. Subsequent meetings with SU and PRMC officials to clarify the process for future DNP students at PRMC have been effective.

However, there were multiple facilitators of this DNP project at PRMC during the actual implementation phase, including several members of the executive team. Dr. Mark Weisman, the Chief Medical Information Officer at PRMC, helped to integrate the Basoor Discharge Checklist into the EMR. Part of his role includes continuous quality improvement surrounding patient care. Initially, the Epic EMR programmers reported that implementation of the checklist might take months to integrate with the EMR, thereby making it impossible for this student to implement the checklist electronically. However, he had the Basoor Discharge Checklist generated for HF patients admitted to the PIPs within one week.

Other executive staff members continue to be supportive of this project at PRMC. From the Population Health Division, Kathryn Fiddler, DNP, RN, NE-BC and Lynne Armiger, MSN, CRNP provided regular updates to the DNP student in addition to the organizational perspective for these population health goals. Simona Eng, DO, FACOI, SFHM, President of Medical Staff and Medical Director of the PIPs, also assisted with educating her staff regarding the use of the Basoor Discharge Checklist.

In addition, several individuals at SU and PRMC supported this DNP project. Dr. Seldomridge and Dr. Winter helped gain clarity around the Research Review Council's process. As committee chair, Dr. Seldomridge provided direction and guidance throughout the implementation phase of the project. Project Committee Member, Dr. Sebach also helped identify methodology changes in the project that allowed for smoother implementation of the DNP project at PRMC. Dr. Batool and Dr. Nayim continued to use the checklist as part of the patient discharge process and encouraged the other PIPs to do the same. Brooke Sproul, a business intelligence developer and analyst, helped to build reports that the DNP student generated whenever logged into the PRMC EMR. This prevented delays in accessing data for the quality improvement project because the DNP student did not have to wait for someone else to generate a report of patients where the Basoor Discharge Checklist utilized.

Summative Evaluation of Implementation Process

There were several incidental findings identified by this DNP student while reviewing data during the implementation phase of the Basoor Discharge Checklist. The first was that the providers who used the checklist demonstrated more complete

documentation surrounding their medical decision-making. For example, when patients

could not receive an ACEI or ARB due to a contraindication, it was documented in the

discharge summary. This information would be extremely helpful to primary care

providers and cardiologists who followed up with the patient once discharged. Moreover,

there was marked variability in the way the checklist was completed by the multiple

providers during the implementation phase. Several providers completed only the

medication portion of the Basoor Discharge Checklist and deleted the rest of the checklist

from their discharge note. While still helpful, this meant that information regarding

whether patient education was provided by nursing or the PIPs and whether follow-up

appointments were made prior to discharge was not easily visible to other care providers.

Another incidental finding discovered during the implementation phase of this

project was that patients were admitted (and discharged) from any inpatient unit of the

hospital with a HF diagnosis by the PIPs. In the past, nursing staff on two specific cardiac

units had received education on how to best deliver patient education on HF, but this had

not been disseminated to the medical units. This potentially impacted the number of

patients who received HF education while in the hospital.

Further, once the implementation phase of the quality improvement project began,

the Basoor checklist was not completed on the majority of patients who were admitted to

the hospital with a HF diagnosis as part of their active hospital problem list. Although

there was an assumption that some providers chose to delete the entire checklist from

their note, it is also possible that the checklist did not trigger correctly for the PIPs who

used a customized discharge summary template. These factors helped to explain why the

Basoor Discharge Checklist was completed in only 28 of 193 (14.5%) hospital

admissions reviewed during the implementation phase of this project.

Analysis and Discussion of Findings

Analysis

Data analysis was performed using Intellectus Statistics™, utilizing both

descriptive and inferential statistics. It was first used to compare the groups of patients

who were discharged from the hospital before implementation of the CHF quality

indicator checklist and EMR alert system to those who were discharged after

implementation of the CHF quality indicator checklist and EMR alert system. The

analyses also compared the groups of patients where PIPs utilized the Basoor Discharge

Checklist at the time of discharge and those who did not.

Baseline data collected from November through December 2017 included 29

patients admitted with an acute HF exacerbation to PRMC and discharged by the PIPs.

These data were obtained by reviewing the EMR. Of these patients, 16 (55%) were male,

13 (45%) were female and ranged in age from 37 to 94 years old, with a median age of 75

years. Several patients (N=12; 41%) had been admitted to the hospital multiple times

within a 30-day time period. Most patients had systolic HF, including 12 (41%) patients

with an EF of less than 40% and an additional four (14%) patients with a borderline EF

from 41% to 49%. Of the remaining patients, 11 (40%) had diastolic HF or HF with a

preserved ejection fraction (HFpEF). According to the AHA, this includes patients who

have an EF from 50-70%.

In addition, only 11 (38%) patients received an ACEI or ARB when discharged from the hospital (Kestler, 2018). There was no mention in the discharge summaries as to why these patients were not sent home with these prescriptions. More than half of patients (N=16; 55%), admitted to the hospital received a TTE during their stay. However, 25 (86%) had received a TTE within the past six months. There were two (7%) patients who received a TTE in 2016 and two more who had an unknown last TTE (Kestler, 2018). Four (14%) patients left the hospital with a scheduled cardiology appointment. Table 1 displays the data for this baseline group.

Data were collected after implementation of the Basoor checklist and included all patients who had HF listed in the EMR on their active hospital problem list admitted to the Peninsula Inpatient Provider group from November to December 2018. A final review of the data collected during the implementation period took place in January 2019, once the implementation period was completed. The final sample size included 193 patients. Of these patients, 18 (10%) had the Basoor discharge checklist completed in its entirety within the discharge summary and 10 (5%) had part of the Basoor checklist completed upon discharge. Unfortunately, the majority of patients (N=165, 85%) were discharged by the PIPs did not have the Basoor Discharge Checklist documented within the discharge summary. The group included 102 (53%) females and 91 (47%) males ranging in age from 21 to 97, with a median age of 72 years old. One third of patients had HFrEF including 63 (33%) patients with a low EF and four (2%) patients with a borderline EF. More than half (N=106, 55%) of the patients in the implementation group had HFpEF. Most of the patients (N=101, 51%) in this group also had a 2-D echocardiogram

completed during their current hospital admission, an important part of the PRMC HF

pathway.

There were 88 (45%) patients, including those prescribed the combination drug

Entresto™, who had an ACEI/ARB prescribed at the time of discharge from the hospital

and 107 (55%) patients who did not have an ACEI/ARB prescribed at discharge. Of the

193 patient encounters reviewed, only 49 (25%) patients had their cardiology

appointments listed. The implementation group is described in Table 2.

The Basoor Discharge Checklist was utilized in some capacity with 28 (14%)

patients in the implementation data set. When it was used at the time of patient discharge,

16 (57%) patients went home with a prescription for an ACEI/ARB and 21 (75%)

patients had a 2-D echocardiogram completed during the current hospital admission.

However, only six (27%) patients were discharged home with a cardiology appointment.

To compare groups with completed or partially completed Basoor Discharge Checklists, a

cross-tabulation analysis was performed. These findings appear in Table 3.

A chi-square test of independence was used to determine whether there was a

relationship between utilization of the Basoor Discharge Checklist and ACEI/ARB

prescription at discharge, 2-D echocardiogram completion, and cardiology appointments

made while in the hospital. For prescription of an ACEI/ARB at discharge, the results of

the chi-square test were significant, $\chi^2(4) = 9.82$, $p = .044$, suggesting that ACEI/ARB

prescribed at discharge and Basoor Discharge Checklist completed are related to one

another. No statistically significant relationships were found for use of the Basoor

Discharge Checklist and 2-D echocardiogram completion or cardiology appointments made at discharge. These results are detailed in Tables 4, 5, and 6.

Discussion of Findings

This quality improvement project was unable to demonstrate a reduction in 30-day readmission rates for multiple reasons, including time constraints related to implementation of the project, provider engagement, and consistent use of the EMR discharge template. However, there is evidence that those providers who implemented the Basoor Discharge Checklist for patients with a HF diagnosis prescribed ACEI/ARBs at discharge, ordered 2-D echocardiograms during the hospitalization, and made outpatient cardiology follow up appointments prior to hospital discharge more frequently than those who did not utilize the checklist. It was also noted that the providers who did not order ACEI/ARB medications at discharge were more likely to type a free-hand note to specify why these medications were contraindicated for their patients when using the Basoor Discharge Checklist, similar to the way it was designed for paper implementation. These items were all evidence-based components of the PRMC HF pathway- interventions meant to reduce 30-day readmissions and increase the standard of care experienced by the local patient population.

Additionally, education provided to the PIPs regarding the importance of utilizing the Basoor Discharge Checklist was completed by fellow providers, and it was unknown how this was approached or emphasized since a standardized educational strategy for this was beyond the scope of this project. In addition, it was likely that some providers were unable to attend the staff meetings or department of medicine meetings which introduced

the Basoor Discharge Checklist. Some providers utilized the Basoor Discharge Checklist

regularly, while others never used it. Patient education by nurses was another unknown

variable as it was not tracked through this quality improvement project. For patients

admitted to PRMC with a HF diagnosis, there was standardized patient education

available to all nursing units in the hospital. This included patient education videos and a

patient education booklet for use with 15-minute nurse-led education sessions. This

education was emphasized one year ago within the two units considered most likely to

have patients admitted with a HF diagnosis. However, in reviewing charts for the

implementation group, patients with HF were often discharged from medical or surgical

units, not just cardiac-specific units. Since the nursing staff on the general medical and

surgical units did not receive special educational preparation, this might have influenced

the quality and consistency of nurse-provided education for HF patients, despite the

availability of the HF teaching booklet to all inpatient units.

     An incidental finding was the sheer volume of HF patients seen at PRMC within

such a short time frame. The report developed for the implementation phase included

every patient who had HF listed on their global problem list. The inpatient list of patients

alone was about 500 patient hospitalizations. As HF is a very complex disease, there

appeared to be opportunities for providers and nurses to deliver ongoing education while

patients were in the hospital, regardless of the unit to which they were admitted..

Limitations

     There were several limitations of this quality improvement project that should be

considered prior to another PDSA cycle. First, the Basoor Discharge Checklist

completion was initially planned as a "hard stop" for providers wherein all PIPs would be required to answer all questions on the Basoor Discharge Checklist before finishing a discharge summary. This would have ensured provider adherence with discharge checklist use. As was discovered during the implementation phase, the PIPs were able to modify and delete the checklist, resulting in incomplete or nonexistent checklists and a final sample size of 28 out of 193 eligible patients. Provider adherence could be corrected by making checklist utilization a hard stop in the EMR and prevention of checklist modification or deletion. In addition, the checklist should be functional even when providers have customized their discharge summary format in the EMR.

Furthermore, the PIPs provided their own education on the use of the Basoor Discharge Checklist. It was unknown how this education was provided or whether this later contributed to the variability noted in the completion of the Basoor Discharge Checklist. In the future, education could be delivered to all of the PIPs in a standardized format, with clear expectations.

Another limitation to this project was that patients admitted with HF were on a wide variety of inpatient units, not just specified cardiac units. Future PDSA cycles might include nursing education designed to help nurses best utilize the HF teaching booklet on all inpatient units. In addition, it would be necessary to make the documentation of any patient education completed by nursing staff more visible in the EMR by the providers. This would helpidentify which pieces of education on the Basoor Discharge Checklist needed to be addressed. Ideally, the nursing education would be part of the Basoor

Discharge Checklist within the EMR, saving the providers time in the discharge process and improving coordination of care.

Lastly, the project's implementation phase was shortened by one month due to unanticipated delays with the PRMC Research Review Council and IRB approvals. This also contributed to the lower number of participants in both the baseline data collection and the implementation data collection. Future quality improvement projects could track the implementation of the Basoor Discharge Checklist for additional PDSA cycles to evaluate its impact over a longer time period e.g. six months and one year. In addition, these time constraints also contributed to how well the Basoor Discharge Checklist was implemented in the EMR. With more time to perfect and test the Basoor Discharge Checklist by Epic programmers, the implementation might have gone more smoothly. Despite these limitations, the Basoor Discharge Checklist was successfully implemented as an evidence-based clinical practice change in the PIPs' work flow.

<div align="center">Recommendations</div>

Economic Considerations

The costs associated with the implementation of the Basoor Discharge Checklist remained low for PRMC. The PIPs were not required to modify their work flow to accommodate the implementation of the checklist. The checklist automatically generated for patients with HF. In addition, all of the patient education materials were already in use at PRMC, incurring no additional expenditures. However, there were some costs associated with the integration of the Basoor Discharge Checklist into the EMR as well as the creation of the reports for data collection including the time of the Chief Medical

Information Officer and the business analyst who created the reports as they were pulled

away from other projects to make this DNP project a reality within the organization.

However, these costs need to be balanced with potential healthcare savings, as each HF

hospital admission can cost approximately $14,000 (Kilgore, Patel, Kiehlhorn, Maya, &

Sharma, 2016).

Implications for practice

Preventing readmissions for HF patients is both a complex and multifactorial

process, reinforcing the importance of a comprehensive and evidence-based discharge

process for all patients admitted to the hospital with HF. The use of an evidence-based,

standardized checklist as part of the discharge process was demonstrated in the literature

to be an effective way of reducing hospital readmissions (Abdallah, et al., 2017).

Although the implementation phase of the DNP project was too short to determine

whether it impacted the 30-day readmission rate in a significant way, it made strides in

addressing some of the factors contributing to the high 30-day readmission rate seen by

the PIPs. This ultimately helped improve the transition of care among patients with HF

from the inpatient to the outpatient setting. When using the Basoor Discharge Checklist,

providers demonstrated an increased ability to address ACEI/ARB prescription, inpatient

education, and follow-up appointments as part of the discharge process. This remained

true whether the patient was admitted for a HF exacerbation or not. Completion of the

checklist took approximately five minutes of provider time to complete, yet it provided

valuable reminders to address prescriptions, HF education, and follow up appointments

with the patient. The checklist could easily be implemented for all admitting providers in

the hospital. The implementation of the checklist also highlighted additional education needs for inpatient nurses at PRMC. Many of these patients were not admitted to designated cardiac units, so the importance of hospital-wide adoption of Dr. Hart's HF education sessions was brought to light. In addition, if using the Basoor Discharge Checklist proves to lower 30-day readmission rates for people with a HF diagnosis, there is the possibility of similar evidence-based checklists being used for other chronic diseases as well at PRMC.

DNP Role

The American Association of Colleges of Nursing (AACN) states the Doctorate of Nursing Practice (DNP) project should serve as a, "foundation for future scholarly practice" through a "practice immersion experience" (2006, p. 21). These projects can take on a variety of formats depending on the student's prior experience and interests, but the focus should remain on translating evidence in such a way as to improve patient or practice outcomes (AACN, 2006). In doing so, the DNP student should demonstrate growth in leadership while meeting DNP essential competencies (AACN, 2006).

Through the completion of the project, "Implementation and Evaluation of an Inpatient CHF Quality Indicator EMR Checklist and Alert System", this DNP student demonstrated growth in leadership and innovation by meeting the following DNP Essentials and National Organization of Nurse Practitioner Faculties (NONPF) core competencies.

Essential II: Organizational and Systems Leadership for Quality Improvement and Systems Thinking

According to the AACN, the DNP graduate must demonstrate competency in developing quality improvement strategies, integrating them within an organization, and having a plan for sustaining the practice change (2006). Similarly, NONPF states that a nurse practitioner candidate should demonstrate proficiency in the use of quality improvement methods such as PDSA, a culture of safety, and evaluate how organizational structure and process can influence healthcare quality (National Organization of Nurse Practitioner Faculties, 2017). The Basoor Discharge Checklist is an evidence-based checklist which facilitated quality improvement for HF patients at PRMC forming the foundation for this DNP project. This DNP student demonstrated growth in leadership by working alongside PRMC's Population Health department to develop goals for implementing the Basoor Discharge Checklist which were guided by PRMC organizational goals and priorities. The Population Health Department is trying to improve the readmission rate of HF patients within the local community through the implementation of a comprehensive HF pathway that follows patients from hospital admission to their outpatient cardiology follow up appointments. Utilizing the Basoor Discharge Checklist at the time of hospital discharge could ensure that patients receive comprehensive education, appropriate medications, and follow-up appointments prior to leaving the hospital setting. This DNP student worked closely with executives from three different departments within PRMC- Population Health, Information Services, and Medical Staff. In addition, the entire process of navigating the PRMC Research Review

Council approval through the implementation of the checklist within the EMR Epicwas

very complicated and required the DNP student's oversight at every individual step. This

student had to communicate effectively with physicians and advanced practice providers

in addition to nursing staff and educators while remaining sensitive to organizational

cultures, another competency of this DNP Essential (AACN, 2006).

Essential III: Clinical Scholarship and Analytical Methods for Evidence-Based Practice

The AACN states that this DNP Essential helps prepare the graduate to take

evidence and translate it into organizational practice through the implementation of a

practice change which improves the outcomes of patient care or an organization (2006).

This aligns well with the NONPF nurse practitioner competency for practice inquiry

which includes the ability to identify clinical practice problems and investigate methods

to improve health care outcomes within clinical practice (2017). The translation of

evidence helped provide the groundwork of the DNP project as the DNP student analyzed

the appropriate evidence and then designed and directed a project to improve the

transition process for HF patients as they were discharged from the hospital setting back

to the outpatient setting. After spending time with the Accountable Care Organization

case managers within a local high-volume practice, the DNP student witnessed first-hand

that many patients do not know their HF diagnosis on discharge, have the appropriate

medications prescribed, or have their appointments made with their primary care provider

and cardiologist prior to hospital discharge. By the time this project was completed, the

DNP student also evaluated the use of the Basoor Discharge Checklist and disseminated that information to the leadership team at PRMC.

Essential IV: Information Systems/Technology and Patient Care Technology for the Improvement and Transformation of Health Care

In today's technology-driven society, information systems play an important role in helping DNP graduates "apply new knowledge, manage individual and aggregate level information, and assess the efficacy of patient care technology appropriate to a specialized area of practice" (AACN, 2006, p.12). This DNP project required integration of the Basoor Discharge Checklist within PRMC's EMR to help ensure it was used by the intended physicians and prescribers. Although it was not integrated as originally planned, the Basoor Discharge Checklist was automatically generated when a Peninsula Inpatient Provider started a discharge note on a HF patient. The DNP student demonstrated growth in extracting data from the patients' medical record through the implementation period of the DNP project. Additionally, the DNP student made suggestions for improved reports generated by the use of the Basoor Discharge Checklist which helped improve data collection throughout the implementation period. There was a time when there was some doubt whether the Basoor Discharge Checklist would be integrated into the EMR quickly enough for this DNP student's project, and the student demonstrated innovation as she prepared a paper checklist for implementation as an alternative option.

Essential VII: Clinical Prevention and Population Health for Improving the Nation's Health

The DNP graduate should demonstrate leadership to "integrate and institutionalize evidence-based clinical prevention and population health services for individuals, aggregates, and populations" (AACN, 2006, p. 15). This DNP project required an understanding of the local HF population served by PRMC in Salisbury, MD to help determine appropriate evidence-based interventions. Initially, this DNP student did not understand (despite working within the PRMC system for 14 years) the scope of the HF readmission problem. However, through chart review in the spring (which led to an interest in Population Health and local outcomes), this DNP student became involved in developing a DNP project that would help reduce HF readmissions with the local population. The DNP student grew to understand that HF readmission is a multifactorial problem which requires interdisciplinary collaboration. The AACN states that DNP graduates should be able to analyze population data, design interventions that address gaps in patient care, evaluate the interventions implemented (2006). This DNP student witnessed that patients often do not understand their disease or receive the education necessary for self-care outside the hospital. In addition, the patients did not always know the importance of their medications, daily weights, diet, or follow up appointments on their future health. This DNP student demonstrated both leadership and innovation by developing a DNP project that utilized team members from a wide variety of backgrounds and areas of expertise.

Although this DNP project addressed one small step in the overall HF pathway, the discharge process is very important for improved patient outcomes. Patients need the proper tools for success, and if they leave the hospital without a cardiology appointment, the hospital staff has failed to provide those tools. Through the implementation of this project, this DNP student has shown growth as a leader and an innovator as barriers to implementation arose.

Process and outcome recommendations

There was evidence to suggest ways to improve the process of implementing the Basoor Discharge Checklist for future PDSA cycles. First of all, standardized utilization of the checklist at discharge in the EMR would provide better opportunities for it to be effectively used at PRMC. This would include making sure the checklist automatically generates in a provider's discharge summary note without ability to modify or bypass its completion. Standardizing provider education on the use of the Basoor Discharge checklist could increase the number of patients who had the Basoor Discharge checklist completed at discharge. Furthermore, it was noted throughout the project's implementation phase that there were many patients admitted to PRMC who had HF on their global problem list. Due to the complexity and chronic nature of a HF diagnosis, admitting providers should be reminded to include this disease on the hospital problem list as well. In addition, nursing staff on all inpatient units (not just cardiac and critical care areas) should receive standardized HF disease process education to help more nurses understand the importance of educating every patient about their HF diagnosis, regardless of the unit to which they are admitted. Consequently, nursing management and providers

could hold nursing staff accountable for HF education throughout inpatient units. Ensuring the visibility of this education in the EMR for the providers would also help make completion of the Basoor Discharge Checklist even easier.

<div align="center">Dissemination</div>

Dissemination of the DNP project results was a required step in the process of translating nursing research into practice (Curtis, Fry, Shaban, & Considine, 2016). This can be done through professional presentations and publications, presentation of findings to executive leadership and stakeholders, or through online webinars (Moran, et al., 2017). Dissemination of this DNP project included presentations locally as well as submission of a manuscript to a peer-reviewed publication. The project was first presented formally to the SU community as part of the student's DNP project presentation. Attendees included members from SU, PRMC, and local community. After completion of the project, the results were officially presented to the PRMC Population Health leadership team as well as the HF team at a monthly meeting. In addition, the results were also presented to the PIPs at their monthly staff meeting. Once all of the results were presented to the local stakeholders, the DNP student will also research additional opportunities for presentations at national conferences or peer-reviewed publication.

<div align="center">Conclusion</div>

The findings of this quality improvement project were inconclusive as to whether implementation of a standardized checklist at the time of discharge could reduce the 30-day readmission rate for HF patients at PRMC. However, implementation of the Basoor

Discharge Checklist was shown to increase the prescription of ACEI/ARB medications at discharge. Additional PDSA cycles with improved EMR implementation, staff education, and a longer implementation period are needed to determine whether the Basoor Discharge Checklist can have an impact on the 30-day readmission rates for HF patients.

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Table 1

Characteristics of Baseline Data Collection Group (N = 29)

Variable	*n*	*%*
Gender		
Male	16	55.17
Female	13	44.83
ACEI_ARB		
Yes	11	37.93
No	18	62.07
X2_D_Echo		
Yes	19	65.52
No	8	27.59
Unknown	2	6.90
EF		
Normal (50-70%)	11	37.93
Low (<40%)	12	41.38
Borderline (41-49%)	4	13.79
Unknown	2	6.90
Cardiology_Appt_Made_at_D_C		
Yes	4	13.79
No - Pt Instructed to Make Appt	24	82.76
Pt Left AMA - No Appointments	1	3.45

Table 2

Characteristics of Implementation Data Collection Group (N = 193)

Variable	*n*	*%*
Gender		
Male	91	47.15
Female	102	52.85
ACEI_ARB_Prescribed_at_Discharge		
Entresto ™	22	11.40
Yes	64	33.16
No	107	55.44
X2_D_Echo_Completed_This_Admission		
Yes	101	52.33
No	75	38.86
Unknown	17	8.81
EF		
Low (<40%)	63	32.64
Normal (50-70%)	106	54.92
High (>70%)	1	0.52
Borderline (40-49%)	4	2.07
Unknown	19	9.84
Cardiology_Appt_Made_at_D_C		
Yes	49	25.39
No - Pt Instructed That Nurse Would Make Follow Up Appt	27	13.99
No - Not Instructed to Follow Up with Cardiology	75	38.86
No - Pt Instructed to Make Appt	42	21.76
Basoor_Checklist_Completed		
Completed	18	9.33
Partial Completion	10	18
No	165	85.49

Table 3

Cross-Tabulation of HF Measures with Basoor Discharge Checklist Use

Variable	Partial Completion	Completed	No
ACEI_ARB_Prescribed_at_Discharge			
Entresto™	4 (40%)	3 (17%)	15 (9%)
Yes	3 (30%)	6 (33%)	55 (33%)
No	3 (30%)	9 (50%)	95 (58%)
X2_D_Echo_Completed_This_Admission			
Yes	8 (80%)	13 (72%)	80 (48%)
No	2 (20%)	4 (22%)	69 (42%)
Unknown	0 (0%)	1 (6%)	16 (10%)
Cardiology_Appt_Made_at_D_C			
Yes	3 (30%)	3 (17%)	43 (26%)
No - Pt Instructed That Nurse Would Make Follow Up Appt	2 (20%)	5 (28%)	20 (12%)
No - Not Instructed to Follow Up With Cardiology	3 (30%)	6 (33%)	66 (40%)
No - Pt Instructed to Make Appt	2 (20%)	4 (22%)	36 (22%)

Table 4

Basoor Discharge Checklist Completion and ACEI/ARB Prescription: Chi-Square Test of Independence

	Basoor_Checklist_Completed					
ACEI_ARB_Prescribed_at_ Discharge	Partial Completion	Completed	no	χ^2	df	p
Entresto™	4[1.14]	3[2.05]	15 [18.81]	9.82	4	.044
Yes	3[3.32]	6[5.97]	55 [54.72]			
No	3[5.54]	9[9.98]	95 [91.48]			

Table 5

Basoor Discharge Checklist Completion and 2-D Echocardiogram Completion: Chi-Square Test of Independence

X2_D_Echo_Completed _This_Admission	Basoor_Checklist_completed			χ^2	*df*	*p*
	Partial Completion	Completed	No			
Yes	8[5.23]	13[9.42]	80 [86.35]	7.1	4	.13
No	2[3.89]	4[6.99]	69 [64.12]			
Unknown	0[0.88]	1[1.59]	16 [14.53]			

Table 6

Basoor Discharge Checklist Completion and Cardiology Appointments Made at Discharge: Chi-Square Test of Independence

Cardiology_Appt_Made_at_D_C	Basoor_Checklist_completed			χ^2	*df*	*p*
	Partial Completion	Completed	No			
Yes	3[2.54]	3[4.57]	43 [41.89]	4.18	6	.652
No - Pt Instructed That Nurse Would Make Follow Up Appt	2[1.40]	5[2.52]	20 [23.08]			
No - Not Instructed to Follow Up With Cardiology	3[3.89]	6[6.99]	66 [64.12]			
No - Pt Instructed to Make Appt	2[2.18]	4[3.92]	36 [35.91]			

Appendices

Appendix A: Table of Evidence

Citation	Participants/ Setting	Purpose, Background	Methods/ Design & Limitations - Hierarchical Level	Findings/ Summary Strengths/ Weaknesses	Applicability to Own Project
Use of a Checklist for Discharge					
Lewis, C., Cox, Z., & Lenihan, D. (2014). Take-CHARGE: Heart failure discharge checklist, communication, and data collection tool. *Heart and Lung, 43*(4), 373-374. Retrieved from https://doi.org/10.1016/ j.hrtlng.2014.06.026	159 heart failure patients in tertiary care, academic medical center	Purpose was to implement a data collection tool in the EMR to determine reason for readmission and communicate it across continuity of care.	Level 3, B Quality Improvement	Data collection allowed identification of HF measures prior to discharge in addition to aiding transition of care. Weakness: Did not include whether this helped reduce readmission	This data collection tool was also implemented successfully in the EMR to help make sure providers did not miss anything at discharge.
Frederick, S., Wai, C., Ly, H., Olsen, M., Van Skike, S., Boer, M....Mowreader, D. (2016). Using a discharge readiness checklist to reduce heart failure admissions. *Heart and Lung, 45*(4), 378-379. Retrieved from https://doi.org/10.1016/ j.hrtlng.2016.05.020	Over 5,000 HF patients	Purpose was to improve discharge process through the implementation of a discharge tool on all inpatients with HF.	Level 3 B-Retrospective for baseline data. Prospective quality improvement.	Use of the discharge checklist resulted in a 3% reduction in HF readmissions. Unknown whether it was implanted with an EMR.	Checklist used at discharge to help reduce HF readmissions.
Basoor, A., Doshi, N., Cotent, J., Saleh, T.,	96 HF patients	Purpose to implement a simple checklist	Level 1 B-Randomized Controlled	Use of the simple checklist was able	This is the tool that the Peninsula Inpatient

Todorov, M., Chokski, N., ...Halabi, A. (2013). Decreased readmissions and improved quality of care with the use of an inexpensive checklist in heart failure. *Congestive Heart Failure, 19*(4), 200-206. Retrieved from https://onlinelibrary. wiley.com/ doi/epdf/10.1111/chf. 12031		prior to discharge for HF patients.	Trial- one group of HF patients used the checklist and one was discharged without the use of the checklist.	to reduce both the 30-day (19% to 6%) and 6- month readmissio n rates (42% to 23%) for HF patients.	Providers would like implemented into the EMR to be used with discharge.
Abdallah, M., Kravitz, K., Sobol, T., Bott-Silverman, C., Starling, R., & Khot, U. (2017). Impact of an electronic medical record heart failure checklist on readmissions. *Journal of American College of Cardiology, 69*(11), 790. Retrieved from https://doi.org/10.101 6/S0735-1097(17)34179-7	4961 HF patients with over 900 patients readmitted for HF within 30 days	Purpose to reduce 30-day readmission rate with a goal of less than 20% readmissions after implementation	Level 3 B Quality Improveme nt EPIC inpatient HF checklist implemente d in the EMR with a hard stop prior to discharge.	Use of the checklist was able to reduce HF readmissio ns from 24.8% to 18.9%, meeting the goal of < 20%.	The preferred method of implementing a HF checklist at PRMC would include a checklist in the EMR with a hard stop to ensure compliance with the checklist.
Heart Failure Education					
Arthur, K., Collier, M., Foreman, J., Witt, J., Worrell, M., Dunlap, S., & Martino, M. (2015). Improving 60 minutes of heart failure education is associated with a 30 day readmission rate reduction. *Heart & Lung: The Journal of Acute and Critical Care, 44*(6), 552-552.	Inpatients with heart failure	The purpose was to reduce the number of HF readmissions over 2 years by increasing the number of patients who received 60 minutes of HF education prior to discharge.	Level 3B Quality Improveme nt Limited due to incomplete description of number of patients involved in QI project	Over entire 2 year period, number of patients receiving HF education increased to 71.8% (from 9.6%) and HF readmissio	One of the components of the HF discharge checklist includes inpatient education. Inpatient nursing needs to continue to reinforce 15 minute education points with

				n rates dropped from 29% to 19%.	each HF admission.
doi:10.1016/j.hrtlng.2 015.10.022					
DeWalt, D., Schillinger, D., Ruo, B., Bibbins-Domingo, K., Baker, D., Holmes, G., . . . Pignone, M. (2012). Multisite randomized trial of a single-session versus multisession literacy-sensitive self-care intervention for patients with heart failure. *Circulation, 125*(23), 2854-2862. doi:10.1161/CIRCUL ATIONAHA.111.081 745	605 patients with HF	Purpose was to determine the effectiveness of multiple education sessions versus a single education session for improvement of mortality, hospitalizations, or quality of life for HF patients	Level 1B Randomize d Controlled Trial Patients separated into groups to receive multisessio n or single session HF training.	People with low literacy seemed to benefit from multisessi on education more than those with higher health literacy. Limitation - the education did not seem to improve clinical outcomes.	The Eastern Shore generally has a population of people who are not very health literate. If we want them to understand discharge recommendati ons, it is important to include multisession education.
Boyde, M., Song, S., Peters, R., Turner, C., Thompson, D., & Stewart, S. (2013). Pilot testing of a self-care education intervention for patients with heart failure. *European Journal of Cardiovascular Nursing : Journal of the Working Group on Cardiovascular Nursing of the European Society of Cardiology, 12*(1), 39-46.	38 patients with CHF	To pilot test the efficacy of self-care education and DVD program over 8 weeks with CHF patients	Level 3B Pre-and Post-test design to determine whether education effectively increased self-care knowledge	Use of patient education program showed a statisticall y significant increase in self-care knowledg e as evaluated through pre-and post- tests.	Although not tailored for inpatient education, this study lends confidence to the importance of providing education to CHF patients.

doi:10.1177/1474515 111430881					
Provider Interventions					
Chua, C., Hutchinson, A., Tacey, M., Parikh, S., Lim, W., & Aboltins, C. (2018). A physician targeted intervention improves prescribing in chronic heart failure in general medical units. *Bmc Health Services Research, 18*(1), 206-206. doi:10.1186/s12913-018-3009-x	468 HF patients	The purpose of this study was to determine whether education given to providers would help increase compliance with ACEI/ARB and Beta-blocker prescription recommendations and whether an increase in compliance would decrease readmission rates	Level 3B Quality Improveme nt Providers were given structured education for 3 months prior to data collection on medical units of ACEI/ARB and beta-blocker prescriptio n adherence	Overall, the complianc e rate of ACEI/AR B prescriptio ns rose from 60 to 92% and beta-blocker prescriptio ns held strong at 89%.	In this project, it will be important for the providers to remain engaged and complete the discharge checklist- this study demonstrates the importance of clarifying this with them as well as nursing staff.
Punnanithinont, N., Kairouz, V., Diaz Del Carpio, R., & Page, B. (2018). A multidisciplinary checklist for management of acute decompensated heart failure: A quality improvement initiative. *Circulation: Cardiovascular Quality and Outcomes, 9*(2). Retrieved from https://www.ahajourn als.org/ doi/abs/10.1161/circo utcomes. 9.suppl_2.109	34 acutely decompens-sated HF patients	A multidisciplinary checklist was used to help guide inpatient care by in-house providers	Level 3B: Quality Improveme nt Limited by number of participants	Decreased 30-day HF readmissio ns by almost half (47% to 24%) and helped physicians adhere to current HF guidelines	The proposed project also includes different disciplines, Including inpatient providers. Project focus is primarily geared toward inpatients though.

Appendix B: Basoor Checklist

Basoor's Heart Failure Checklist

| Patient Name |
| DOB: |
| OR |
| PLUE Label |

Primary Cardiologist/ Attending:_____
Discharge Date: _____
Brief History: _____
Non Compliance to Medications: No □ ; Yes □_____

MEDICATIONS prescribed?	Yes	No	Dose Modified	Reason if not prescribed/ titrated up or COMMENTS	Initials
β-Blocker	□	□			
ACE Inhibitor (ACE I)	□	□			
ARB (if ACE I intolerant or in addition)	□	□			
Diuretics	□	□			
Digoxin (if Atrial Fibrillation or refractory symptom)	□	□			
Aldosterone Antagonist	□	□			
Nitrates (as needed or indefinite or both)	□	□			
Warfarin (if yes latest INR in comments)	□	□			
Aspirin	□	□			
Lipid lowering agents	□	□			
Other	□	□			

INTERVENTIONS And COUNSELING measures addressed?	Yes	No	COMMENTS	Initials
General risk modification education	□	□		
Treatment and adherence education	□	□		
Heart Failure Monitoring (including low salt diet fluid restriction if needed, daily/weekly weight, activity)	□	□		
Blood pressure control	□	□		
Smoking Cessation Counseling	□	□		
Dyslipidemia control	□	□		
Diabetes control	□	□		
Dietitian/nutritionist interview	□	□		
Cardiac rehabilitation interview and enrollment	□	□		

FOLLOW-UP services scheduled?	Yes	No	COMMENTS	Initials
Cardiologist follow-up	□	□		
Primary care follow-up	□	□		
Cardiac rehabilitation	□	□		
Anticoagulation service follow-up	□	□		
Visiting Nurse/Home Care if needed	□	□		
Patient record release form signed if needed	□	□		
Other (eg. Electro-Physiology follow up)	□	□		

M.D./P.A./N.P. Signature _____ Date: _____ Time: _____
M.D./P.A./N.P. Signature _____ Date: _____ Time: _____
M.D./P.A./N.P. Signature _____ Date: _____ Time: _____

The Checklist was developed by Dr. Abhijeet Basoor, in collaboration with the Cardiovascular Quality Integration Board at St. Joseph Mercy Oakland Hospital, Pontiac, Michigan, USA.

Appendix C: PRISMA diagram

Flow Diagram (PRISMA, 2009)

The following flow diagram identifies the search and selection and has been

reproduced with permission from the PRISMA group (2009).

Identification

Records identified through
database searching
(n =432)

Additional records identified
through other sources
(n = 10)

Screening

Records screened
after duplicates removed
n= 98

Records excluded by
review of abstract
(n = 78)

Full-text articles assessed
for eligibility
(n =20)

Full-text articles excluded
(n =11)
Evidence-based patient
education not utilized (n=5)

Discharge checklist not utilized
for discharge process (n=6)

Eligibility

Studies included in
qualitative synthesis
(n = 0)
Review of literature articles
used for hand search and to
identify seminal research

Included

Studies included in
quantitative synthesis
(n = 9)

Appendix D: SWOT Analysis

Strengths (Internal traits that are helpful to the project)	Weaknesses (Internal traits that could be harmful to the project)
Executive leadership support Peninsula Inpatient Provider support and involvement Established electronic medical record (Epic) has ability to track data and allow for improved processes Established heart failure education for inpatients Opportunity for bedside nursing involvement	Potential variations in completion of the checklist by Peninsula Inpatient Providers Lack of consistent admission floors for patients with heart failure Some patients might not be accurately identified as having heart failure on admission High patient to provider census for the Peninsula Inpatient Providers Variations in education delivery by nursing staff
Opportunities (External factors that could help the project)	Threats (External factors that could harm or interfere with project success)
Medicare policies support reducing 30-day readmissions for heart failure patients. Support from the Accountable Care Organization (ACO) associated with PRMC Integration of the EMR across multiple local practices to help transition care effectively Peninsula Inpatient Providers provide care for most of the inpatients at PRMC, regardless of primary care provider	Competing priorities within the organization

Appendix E: IRB Approval Letters

Salisbury
UNIVERSITY
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Salisbury University
Institutional Review Board
Committee on Human Research
Phone: (410) 548-3549
Fax: (410) 677-0052
Email:humanresearch@salisbury.edu

IRB Research Protocol Approval Notification

Date: 09/21/18

To: L. Seldomridge
RE: Protocol #10
Type of Submission: Exempt
Type of IRB Review: Exempt
Protocol is scheduled to begin 9/18 and end 5/19.

Approval for this amendment is valid from 9/21/18 to 5/30/19.

CONGRATULATIONS.

This letter serves to notify Dr. Lisa Seldomridge that the Salisbury University (SU) Institutional Review Board (IRB) approved an amendment to the above referenced protocol entitled, Implementation and Evaluation of an Inpatient CHF Quality Indicator EMR Checklist and Alert System on September 21, 2018.
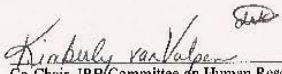
Pursuant to Federal regulations 21 CFR 56.109, the IRB has determined that this protocol qualifies for Exempt review.

Federal regulation 45 CFR 46.103 (b)(4)(iii) requires Primary Investigators (PI), except when a subject is in immediate danger, to assure any change to an approved protocol is not initiated prior to IRB review and approval. Additionally, the PI must also inform the IRB of unanticipated problems involving risks to participants.

These same federal regulations require continuing review of research be conducted by the IRB at intervals appropriate to the degree of risk. Your research is scheduled to begin 9/18 and end 5/19. When necessary, the PI will receive a continuing review reminder notice prior to the date protocol approval ends; however, it is the PI's responsibility to submit continuing review reports in a timely manner (at least 3 weeks prior to scheduled end date on the protocol approval).

The SU IRB is organized and operated according to guidelines of the United States Office for Human Research Protections and the United States Code of Federal Regulations and under Federal Wide Assurance No. FWA00020237.

If you have any questions about this review or questions, concerns, and/or suggestions regarding this process, please do not hesitate to contact the Office of Graduate Studies and Research at 410-548-3549 or humanresearch@salisbury.edu.

Kimberly vanValpen
Co-Chair, IRB/Committee on Human Research

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M E D I C A L   C E N T E R

RICHARD A. HENSON CANCER INSTITUTE
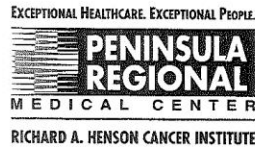
M E M O R A N D U M

DATE: October 19, 2018

TO: Lisa Seldomridge, PhD

FROM: Timothy L. Feist
               Research Review Committee
ACTION: Approved
APPROVAL DATE: October 19, 2018
REVIEW TYPE: Waiver of Jurisdiction

SUBJECT: *Endorsement of Clinical Research Study at Peninsula Regional Medical Center*

STUDY #:   P18-022

STUDY   Implementation and Evaluation of an Inpatient CHF Quality Indicator EMR Checklist and Alert
NAME: System

The Research Review Committee has completed its review of the study request you submitted to determine fit and feasibility with Peninsula Regional's mission, values, and strategic focus.

After review, it was determined that this study would be of value to the institution and the costs associated with the study do not appear to be prohibitive with regards to the resources available.

Therefore; this study has been endorsed, and it was the opinion of the Committee that this study meets the requirements for waiver of jurisdiction to **Salisbury University**, Institutional Review Board, pending final approval by Western IRB, Peninsula Regional's IRB of record.

A request for waiver of jurisdiction has been submitted to Western IRB on your behalf. Before this study can commence at Peninsula Regional, confirmation of unconditional approval from Western IRB must be received by the Research Review Committee.

If you have any questions or should need additional information, please feel free to contact Stephanie Cason, Research Program Manager, 410-543-7017.

Timothy L. Feist
Research Review Committee

100 East Carroll Street ▫ Salisbury, MD 21801-5493 ▫ 410-543-7006 ▫ www.peninsula.org

WIRB.

Global Leader | Proven Expert

October 23, 2018

Patty Chance
The Cancer Center
Richard A. Henson Cancer Institute at
Peninsula Regional Medical Center
100 E. Carrill Street
Salisbury, MD 21801

Dear Dr. Seldomridge:

SUBJECT: WAIVER OF IRB JURISDICTION
           Investigator: Lisa Seldomridge, PhD
           Protocol Title: "Implementation and Evaluation of an Inpatient CHF Quality
           Indicator EMR Checklist and Alert System"

This is in regard to your request for waiver of jurisdiction by Western Institutional
Review Board (WIRB) for approval to conduct the above-referenced research project.

WIRB agrees to waive jurisdiction for the IRB review and continuing oversight of the
above-referenced research study to **Salisbury University IRB**, as allowed under 21
CFR 56.114 and 45 CFR 46.114.

If you have any questions, please contact me at (360) 252-2578.

Sincerely,

Kelly FitzGerald, PhD
Vice President, IRB Affairs

KAF:dao
cc: Patty Chance, Peninsula
      David Borasky, MPH, CIP, Vice President IRB Compliance
      Elaine J. Azarenko, C.I.P., Associate Director, Institutions
      Company File #78094; Contact File #239700
      WIRB Follow-Up #451518

Western Institutional Review Board®

1019 39th Avenue SE | Puyallup, WA 98374
Office: (360) 252-2500 | **Fax:** (360) 252-2498 | **www.wirb.com**

Appendix F: Education Provided by Nursing Staff at PRMC

(as outlined by Jennifer Hart, DNP, RN)
Guide for Inpatient Education Sessions

Present the *Dealing with Heart Failure Patient Education Workbook* to your patient
and identify that it is a valuable resource to help them manage their heart failure.
Discuss that they will receive inpatient education over four, 15-minute sessions
throughout hospitalization. Each session coincides with the workbook. Introduce
each session and tell the patient you will be asking them to repeat back some of the
things they learned in their own words. Explain that this is to make sure they
understand what you have discussed. If possible, include family in the education
sessions.

Session	Education performed with teach back	Unable to perform education (with reason)	Additional teaching required	Family present
1	HF definition HF causes Ejection Fraction HF signs & symptoms Living well with HF			(Y/N)
	TIGR video: *Heart Talk: Living with Heart Failure* (24 minutes)			
2	How to take medications Refills Pill system Diuretic How to weigh yourself HF zones too			
3	Why to eat less salt How to eat less salt High salt foods Low salt foods Food labels Daily salt intake			
	TIGR video: *Salt matters* (4 minutes)			

| 4 | Exercising with HF
Beginning exercise
When to stop exercising
Fluid intake
Smoking cessation
Alcohol intake
Other healthy changes | | | |
| | TIGR video: *Smoking: Getting Ready to Quit* (16 minutes) | | | |

Session 1

Introduction: Many people with HF lead normal, active lives, and they do so because they have learned to take good care of themselves. This education book was made to help you learn how you can live successfully with HF. Most of what we discuss can be found right in this booklet.

What is Heart Failure? (page 3)

- Your heart is a muscle that pumps blood throughout your body.
- Blood provides oxygen and nutrients to all your body systems and is necessary for life.
- Heart failure means that your heart cannot pump the blood well.
- This can make you feel:
    - Weak
    - Tired
    - Dizzy
- Heart failure can also cause water/fluid buildup in your legs, feet, and lungs.
    - Water in your legs causes swelling or edema
    - Water in your lungs makes you short of breath
- Heart failure does not mean that your heart has stopped or is about to stop.
    - ❖ *Can you tell me what symptoms you were experiencing when you came to the hospital?*
    - ❖ *Can you tell me what heart failure is?*

What Causes Heart Failure? (page 4)

- Heart failure usually occurs when another problem makes the heart weak or stiff, so it doesn't pump or fill normally.
- Coronary artery disease is a common cause of HF. Other causes include:
    - Previous heart attack
    - High blood pressure or hypertension
    - Lung disease
    - Problems with the heart valves
    - Heart arrhythmias (atrial fib)
    - Diabetes
    - Hyperlipidemia

What is Ejection Fraction? (page 4)

- One of the most important tests used to diagnose HF is to measure your ejection fraction or EF, which is usually done using an echocardiogram.
- This is the percentage of blood that your heart pumps with each beat and indicates how well your heart is pumping.

- A normal EF is 50% or greater. Those with HF often have EFs less than 40%.
    - ❖ *Do you know your ejection fraction/EF?*
    - ❖ *What does the ejection fraction/EF tell us about your heart?*

Recognizing Signs and Symptoms of Heart Failure
- Symptoms of HF include any of the following (I will start with the most common, but it is also important to note that you may not experience all of these):

    - o Trouble breathing (shortness of breath)

    - o Weight gain from water (swelling)

    - o Swelling in the feet and legs

    - o Lack of energy/trouble carrying out physical activities

    - o Difficulty sleeping at night due to trouble breathing (you may need more pillows under your head to sleep comfortably)

    - o Cough with/without frothy sputum (your spit may be pink due to small amounts of blood)

    - o Swollen or tender stomach with loss of appetite

    - o Increased urination at night

    - o Confusion and/or memory problems

        - ❖ *Can you tell me 3 signs of heart failure?*

        - ❖ *Have you had any of these signs of heart failure?*

Things You Can Do to Live Well with Heart Failure (Page 5)
- There are several things that you can do to live well with HF and better manage the disease. These include:
    - o Taking your medicines correctly every day.
    - o Eating less salt.
    - o Exercising regularly.
    - o Weighing yourself daily and doing a daily check for symptoms.
        - ❖ *Can you repeat this back for me?*
        - ❖ *Will you be able to do these things when you are at home? (if no, find out reasons why)*

Conclusion:

- Heart failure is a chronic condition. You must take care of yourself for life (even when you are feeling good).
- Heart failure means your heart does not pump blood as well, which can lead to fluid/water build-up and a variety of signs and symptoms.
- You can take control over heart failure by following proper medication advice and making healthy lifestyle changes.

Video on Demand Programming
- Introduce TIGR programming to patient and have them watch *Heart Talk: Living with Heart Failure* (24 minutes)

Session 2

Introduction:
- We are going to discuss how to take your medications and weigh yourself daily, but let's first review from our last session.
    - ❖ *Can you tell me what HF is?*
    - ❖ *What are some things you can do to live well with HF?*
    - ❖ *Can you tell me 3 signs of HF that you can look out for when at home?*

How to Take Your Medications (pages 6-8)
- Your medications are very important to manage HF successfully. Some medications help get rid of excess fluid, while others help your heart pump better. You may also be on medicine to lower your blood pressure and heart rate. These can help with HF too.
- How to take your medications:
    - o Take your pills every day at the right times.
    - o Don't skip doses– even if you feel good.
    - o Bring enough medicine with you if you are going away from home.
    - o Talk to your doctor if you have any problems taking your medications or getting your medications (side-effects, paying for medications).
    - o Bring an accurate list or your current medications to your provider visits.

Refills (page 6)
- Make sure you always have enough medicine left in your pill bottles and don't let them run out.
- It is good to check how many refills you have left on your bottles when you pick them up from the pharmacy. That way you will always have enough medicine on hand.
- If you have NO refills left, you must call your doctor or pharmacist to get more.

- Ideally you should get all your medicine from the same pharmacy, so you and the pharmacist can keep track of them properly.
  - ❖ *Have you ever run out of medicines? Did this cause you to miss doses?*
  - ❖ *How would you know you might be at risk for running out of medicine?*
  - ❖ *Who fills your prescriptions?*
  - ❖ *Do you need any prescriptions filled before you leave the hospital?*

Water Pill/Diuretic (page 7)
- Diuretics are commonly prescribed for HF.
- You may know your diuretic as your "water pill".
  - ❖ *Do you know if you currently take a diuretic/water pill? (If yes, which one/s?)*
- It is very important to know which one of your pills is your diuretic/water pill.
- Diuretics control how much salt and water you have in your body.
- Taking more diuretic will make you urinate/pee more. This results in less fluid for your heart to pump, and with less to pump, the heart does not need to work so hard.
- Your doctor may change how much diuretic you take from one day to the next to help keep your body in balance.
  - ❖ *Can you tell me how diuretics work?*
  - ❖ *Why are diuretics important in HF?*
  - ❖ *Have patient or proxy write what diuretic they take in their booklet on page 7.*
  - ❖ *Additional medication teaching to be done at discharge with medication reconciliation.*

Pill System (page 8)
  - ❖ *Do you have a system that helps you remember how and when to take your medicines? (if yes, have patient describe and ask if it works)*
- *If patient has no system to remember pills, proceed with teaching below:*
- Page 8 lists some tips to help you take your medicine on the right days and at the right times. These include:
  - o Keeping an up-to-date list of your medicine with instructions on how and when to take
  - o Keeping medicine bottles in a place that makes it easy to remember to take them.
  - o Using a pill box.
    - ❖ *Do you have a pill box? (Offer to provide patient with a pill box and instruct them how to use it).*

❖ *Do you think one of these tips may help you remember to take your medicine? (If yes, which one? If no, why not?)*

How to Weigh Yourself (page 14)
- Weighing yourself daily is an important measure to monitor your HF.
- Although HF has a variety of symptoms, many people are first alerted to worsening HF when they notice a weight gain, which is caused by excess fluid/water.
- Weight gain may occur up to 2 weeks before symptoms develop.
- You should weigh yourself every morning when you wake up and write this number down in your booklet (pages 17-18). You should bring this record when you see your provider.
- It is important to track your weight, so you can notice sudden changes that may indicate worsening HF.
  - ❖ *Do you have a scale? (If no, will you be able to get a scale?)*
- How to weight yourself:
  - o Weigh yourself each morning (preferably at the same time)
  - o After you urinate/pee
  - o Before you eat breakfast or drink
  - o Without clothes or in light-weight clothing
  - o Before getting fully dressed for the day
  - o Do not hold onto anything when you are on the scale
- Notify your provider if:
  - o Weight gain of > 2-3 lbs. in one day OR
  - o Weight gain of > 5 lbs. in one week
- This may mean your HF is worsening and that you need to see your provider. They may need to adjust your medications, suggest healthy lifestyle changes, or admit you to the hospital.
  - ❖ *Why is it important to weigh yourself every day with heart failure?*
  - ❖ *How much weight gain would prompt you to call your provider?*
  - ❖ *Describe how you should weigh yourself daily.*

Living with Congestive Heart Failure Zones Tool (back page of booklet)
- We're going to talk about the HF zones tool and how to do a daily check.
- You must check yourself every day to find out if your HF is getting worse.
- Ask yourself: How do I feel? Do I have any of the following:
  - o Shortness of breath
  - o Dizziness or faintness
  - o Swelling in the legs and feet
  - o Weight gain *(how much?)*
- Remember, you are looking to identify any change from what is usual or normal for you.

- Color Zones:
    - Green – All clear - Feeling well or like usual (where you want to be)
    - Yellow – Caution - HF Getting worse – Not able to do as much as usual
    - Red – Danger - Feeling very bad/CALL MD, 911, or go to ER
- The key is to identify worsening symptoms and look for the warning signs that HF is worsening.
- If you notice a problem early, you may be able to take action and avoid going to hospital (i.e. adjusting medications or limiting salt intake).
    - ❖ *Looking at the HF zones tool, can you tell me what color zone you would be in if you gained greater than 2 lbs. in one day?*

Conclusion:
- Take your pills exactly as directed and don't skip doses, even if you feel well.
- Develop a system to help you remember to take your pills.
- Weigh yourself each morning and write your weight down.
- Do a daily check each morning to monitor for worsening heart failure.
- Use your HF zones tool to determine if you are doing well or may need to call your provider

Session 3

Introduction:
- We are going to discuss how to eat less salt, but let's review from our last session.
    - ❖ *What is the purpose of your diuretic/water pill?*
    - ❖ *Why is it important to weigh yourself every day with heart failure?*
    - ❖ *Can you describe how you should weigh yourself daily?*
    - ❖ *What will you look for when you do a daily check for symptoms?*

Why You Should Eat Less Salt (page 9)
- Salt acts like sponge and makes the body hold water.
- Too much salt causes weight gain from too much fluid/water, swelling in your legs and feet, and water in your lungs resulting in shortness of breath. This causes your heart to work harder.
- Most foods have salt even if you can't see or taste it.
- Salt is also called sodium.
- Controlling how much salt you eat can help you feel better and manage your heart failure better.

How to Eat Less Salt (page 9)
- Choose foods that are lower in salt.
- Avoid or limit eating foods that are high in salt.

- Don't add salt when you cook
- Take the salt shaker off the table
    - ❖ *Why is sodium/salt bad for someone who has HF?*
    - ❖ *Have you made changes to how much salt you use at home? (If yes, describe)*

High Salt Foods (page 10)
- Let's review some high salt foods that are listed in your booklet.
- High amounts of sodium are found in many canned, pickled, convenience, packaged, processed, and fast foods.
- Sauces, salad dressings, and seasonings have a lot of salt. Try to limit adding these to your foods. Use fresh herbs, lemon, and/or lime to flavor food instead.
- It's good to know what these foods are, so you can avoid or limit these foods.

Low Salt Foods (page 11)
- Let's review some low salt foods that are listed in your booklet.
- Fresh, unprocessed foods are naturally low in sodium.
- It's good to know what these foods are, so you can choose to eat these foods more often.
- You can review these pages at home when choosing what foods to eat.

Reading a Food Label
- I told you earlier that many foods have salt even if you can't see or taste it.
    - ❖ *How do you know how much salt something has in it?* (*If, incorrect state: Reading a food label will tell us how much salt a food has in it)*
- To read a label you should (page 12):
    - o Look at the serving size
    - o Look at the sodium per serving
    - o Choose foods with less than 140 mg per serving
    - o Remember to be careful of how much you eat (i.e. eating several serving sizes)
- Let's review the food label in your booklet.
    - ❖ *Who does the cooking and shopping for you at home? (If this is a family member or caregiver tell the patient to share this information with them, so they know what foods to choose).*
- When shopping, choose items that are labeled (page 13):
    - o Low Sodium
    - o No Salt Added
    - o Sodium Free
- Watch out and review items labeled:
    - o Lower Sodium
    - o Reduced Sodium

- o These items usually only cut salt by 25%-50%
  - ❖ *At home, you can set some goals for reducing your sodium intake. Can you think of any foods that you eat that have a lot of salt?*
  - ❖ *What can you do at home to limit how much salt you eat?*

Daily Salt Intake
- With HF, you should limit your salt intake to less than 2 grams /2000 mg per day.
- Staying under this allowance will help keep excess fluid/water off your body which is better for your heart.
- 1 tsp. of salt contains 2300 mg of sodium, which is more than your daily limit.
  - ❖ *What should your total daily sodium intake be?*
  - ❖ *Can you tell me 3 low salt foods that you can choose to eat?*

Conclusion:
- Salt acts like a sponge and makes the body hold onto more water/fluid, making your heart work harder.
- Controlling how much salt you eat can help you feel better and manage your heart failure more successfully.
- Choose foods that are lower in salt.
- Avoid or limit eating foods that are high in salt.
- Read food labels and limit your salt intake to less than 2 gm or 2,000 mg per day.

Video on Demand Programming
- Have patient watch *Salt Matters* (4 minutes)

Session 4

Introduction:
- We are going to discuss how to exercise well with HF, but let's review from our last sessions.
  - ❖ *How much weight gain would prompt you to call your provider?*
  - ❖ *Besides weight gain, what other symptoms should you be looking out for daily that may indicate your HF is worsening?*
  - ❖ *What should your total daily sodium intake be?*
  - ❖ *Can you tell me 3 high salt foods you will try to avoid or limit?*

Exercising Well with Heart Failure
- Being more active is one of the best things you can do for your heart.

- People with HF need regular physical activity just like anyone else.

- Regular, moderate physical activity can help your heart grow stronger.

How Does Exercise Help People with Heart Failure?

- Your heart is a muscle. Like other muscles, it works better if you exercise it.
- When you exercise regularly, you may find:
    - You have more energy and feel less tired
    - You feel better
    - Your mood improves

Beginning an Exercise Routine with Heart Failure
- Your body needs time to get used to being more active, so start off slowly.
- Begin with 10 minutes of exercise and increase by 5 minutes every couple of weeks.
- You want to work up to 30 minutes, 5 times per week.
- You will notice that it will get easier and you will be able to do more.
- Exercises to consider:

    - Using a stationary bicycle

    - Walking at the mall

    - Swimming

    - Going to an exercise class

    - Sweeping, vacuuming, or dusting

    - Mowing the lawn or working in your garden

    - *(If patient cannot do any of the above, they can still exercise while sitting in a chair (i.e. ROM exercises and arm lifts, leg lifts))*

- Many people say that walking is the easiest for them and they enjoy walking with a friend or their pet.
    - ❖ *Which of these activities would you like to try?*

When to Stop Exercising
- You should stop exercising if you have any of the following:
    - Chest pain
    - Dizziness
    - Severe shortness of breath
    - Intolerable pain in your joints or feet
        - ❖ *Is it okay to exercise with HF?*

Other Lifestyle Changes
- In addition to taking your medications, weighing yourself daily, limiting your salt, and exercising, there are several other lifestyle changes that can help you stay well with HF. I want to discuss a few today.

Fluid Intake

- With severe heart failure, you should limit the amount of fluid you drink to 2 quarts or 64 ounces per day.
- This is the same as eight, 8-ounce glasses (the size of a typical cup).
- Space fluids out over the day.
- Recognize that some foods have liquid or may count as liquid (jello, ice-cream)
- Remember, too much fluid will make the heart work harder and cause symptoms.

Smoking
- ❖ *Do you smoke? (If no, skip section)*
- ❖ *If yes, what do you smoke and how much?*
- ❖ *Are you interested in quitting?*
- ❖ *Provide smoking cessation resources, if needed*

- Each puff of nicotine from tobacco smoke temporarily increases heart rate and blood pressure.
- Smoking also leads to clumping or stickiness in the blood vessels feeding the heart which increases your chance of a heart attack or stroke.

- People who quit smoking are more likely to have their HF symptoms improve.

- Your lungs can begin to heal as soon as you stop harming them with more smoke.

Alcohol
- ❖ *Do you drink alcohol? (If no, skip section)*
- ❖ *If yes, how much do you drink per day and/or per week?*

- Alcohol can raise the levels of some fats in the blood (triglycerides) and cause high BP (hypertension), which makes the heart work harder.

- With heart failure, you should avoid or limit the number of alcoholic beverages you drink. This means no more than:
    - o 1-2 drinks per day for men
    - o 1 drink per day for women

Other Changes to Help You Manage Heart Failure
- Monitoring your blood pressure, especially if your run high

- Getting enough sleep

- Minimizing your stress

- Avoiding or limiting caffeine (<1-2 cups/day)

- Getting your yearly flu vaccine

- Getting the pneumonia vaccine (1-2 doses)

Conclusion:
- Being more active is one of the best things you can do for your heart.
- Begin with 10 minutes of exercise and increase by 5 minutes every couple of weeks.
- Stop exercising if you experience chest pain, shortness of breath, or dizziness.
- Limit the amount of fluid you drink to 2 quarts or 64 ounces per day.
- Your HF symptoms will improve if you quit smoking.
- Avoid or limit your intake of alcohol.

Appendix G- Data Collection Tool

Patient Number	Gender	Pregnant?	Age	Number of admissions in last 30 days	ACEI/ ARB Prescribed on Discharge?	2-D echo completed during admission?	Cardiology appointment made at Discharge?	Basoor Checklist completed in the EMR?	Who is Primary Care Provider

Appendix H- Permission to Use Basoor Discharge Checklist