# COST-EFFECTIVE STRATEGIES TO MINIMIZE HEART FAILURE READMISSION RATES

by

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TABLE OF CONTENTS

TABLE OF CONTENTS CONTINUED

# LIST OF TABLES

Table Page

# LIST OF GRAPHS

Graph Page

# ABSTRACT

The purpose of this project was to identify and analyze the potential costs and benefits associated with the inclusion of a certified heart-failure nurse responsible for inpatient education and outpatient follow-up services for heart-failure patients. Admission and avoidable readmission data for a representative, Eastern Montana, inpatient healthcare facility were obtained and analyzed as the standard care model, and then compared against a care model utilizing a specialist heart-failure nurse responsible for inpatient education and outpatient, post-discharge follow-up care. A five-year pro forma was constructed, presenting a five-year cost versus savings forecast, in which a positive savings trend was estimated over the course of a five-year period.

# CHAPTER ONE

## INTRODUCTION

Central to modern healthcare are the tactics, strategies, methods, and treatments most likely to result in cost-effective care while ensuring the best possible outcomes. Providing the best care for patients is the responsibility of the healthcare team; though a careful consideration of costs while achieving this goal is critical, as resources are not infinite. Steps to enhance patient outcomes must be supported with financial reality. Heart failure (HF) is a disease that weighs enormously on modern American healthcare and one to which the American Heart Association attributed $24.7B in direct medical expenditures in 2010, a number projected to grow to $77.7B by 2030 (Heidenreich et al., 2011).

Heart failure is a disease that is expected to become more common and one whose impact on the national economy is also expected to become more onerous (Heidenreich et al., 2011). Chronic diseases, including HF, have contributed to the National Centers for Health Statistics finding that 2015 was the first year since 1993 when children were projected to live shorter lives than their parents (Xu, Murphy, Kochanek, & Arias, 2016). The increased prevalence and increasing cost associated with treating HF demands action from society to curtail the deleterious effects on human lives and society-level healthcare finance. Bui, Horwich, and Fonarow (2011) and the American Association of Heart Failure Nurses (2015) described increased survival rates following myocardial infarction, increased prevalence of hypertension, and diabetes as key risk factors for the development of chronic HF.

It is important to recognize that economic inflation increases the costs of many things, including the cost of treating chronic disease. The interventions designed to control disease, inflation, or both, have become highly valuable in mitigating the costs associated with the burden of care. The extent to which avoidable readmissions exacerbate the already burgeoning costs of healthcare must be addressed by the healthcare sector itself.

## Background

### Heart Failure as a Disease Process

The medical diagnosis of HF represents the heart's reduced ability to pump blood effectively to the lungs and body (McCance & Huether, 2014). The pathophysiology of HF includes cardiomyopathies, valvular dysfunction, infectious sequelae, and congenital disease (Yancy et al., 2013). Clinical manifestations associated with HF pathophysiology include "dyspnea and fatigue, which may limit exercise tolerance and fluid retention, which may lead to pulmonary and/or splanchnic congestion and/or peripheral edema" (Yancy et al., 2013, p. e246). Heart failure can be an acute disease state, an acute exacerbation of a chronic condition, or a progressively worsening chronic condition, with each of these disease courses displaying a complicated pathological course prior to the development of overt HF (Yancy et al., 2013).

Cardiomyopathy, put simply, is a group of diseases impacting the myocardium, or heart muscle (McCance & Huether, 2014). Included under the larger grouping of cardiomyopathy are: dilated, hypertrophic, restrictive, and arrhythmogenic right

ventricular dysplasia (McCance & Huether, 2014). Dilated cardiomyopathy is a condition in which one or more chambers of the heart dilate, stretching the myocardium beyond a point at which the muscle can form a contraction of the magnitude necessary to effectively eject blood from within the chamber (McCance & Huether, 2014). Hypertrophic cardiomyopathy describes a condition in which the myocardium itself grows and thickens, restricting the flow of blood from the chambers of the heart (McCance & Huether, 2014). Restrictive cardiomyopathy describes a condition in which the myocardium loses an aspect of its contractility, most likely from replacement by non-contractile scar-tissue (McCance & Huether, 2014). Arrhythmogenic right ventricular dysplasia is a rare form of HF in which the contractile tissues of the right ventricle are replaced with scar tissue, impacting the transmission and propagation of electrical signals within the circuitry of the heart, increasing the incidence of cardiac arrhythmias and decreasing ejection fraction via the inefficient generation of cardiac contraction (American Heart Association, n.d.). Regardless of the cause of the cardiomyopathy, each of these pathologies results in a decrease in the heart's ability to effectively eject blood from within its chambers (McCance & Huether, 2014).

The valves within the heart exist to prevent the backflow of blood from one chamber to that which precedes it within the cardiac anatomy (Marieb & Hoehn, 2012). Valvular insufficiency, incompetence, and regurgitation are synonymous terms describing instances in which the valves of the heart fail to close tightly, allowing blood to flow backwards in the heart, resulting in both a heightened state of blood pooling within the heart itself and a reduction in its ability to eject blood forward within the

vasculature (McCance & Huether, 2014). Just as valvular insufficiency impairs the heart's ability to push blood forward, valvular stenosis may impair the initial chamber filling by negatively impacting the amount of blood able to flow into a chamber of the heart in the first place (McCance & Huether, 2014). Stenotic valves are stiff, possibly displaying fusion between adjacent leaflets, preventing the valve from opening fully and blood from flowing freely through it (McCance & Huether, 2014).

Infectious sequelae and congenital disease may result in virtually any of the above pathologies. Viral infection of the myocardium may result in a cardiomyopathy while vegetation of a valve may follow bacteremia resulting in insufficiency or stenosis (McCance & Huether, 2014). The causes of HF may be diverse, but the result of each of these disease processes is a heart left with a reduced ability to eject blood from the heart (Yancy et al., 2013).

Heart failure can exist as an acute response to infectious etiologies, as the result of congenital malformations, as a result of chronic cardiovascular disease, or even as a result of alcohol abuse (Bui, Horwich, &Fonarow, 2011). HF may be seen as a long-term consequence of chronically elevated blood pressure resulting in left ventricular hypertrophy before cardiac remodeling and decreased contractile efficiency and reduced left ventricular ejection fraction (McCance & Huether, 2014). Reduced contractile efficiency can result in peripheral edema, central edema, or a combination of both depending upon the area of myocardium affected (McCance & Huether, 2014). The vascular pooling which leads to the development of third-spacing can lead to additional

vascular pathologies such as thrombosis, profound dyspnea, discomfort, fatigue, and malaise, among others (Yancy et al., 2013).

The results of decreased ejection fraction are multi-systemic and impact the entire body. Persons with HF can experience shortness of breath as diminished cardiac efficiency leads to fluid accumulation within the lungs (McCance & Huether, 2014). They may experience impacted mobility or problems with deep vein thrombosis because of fluid accumulation and diminished fluid return within the legs (American Association of Heart Failure Nurses, 2015). It is difficult to overstate the diversity and magnitude of both the subjective and objective results of heart failure on the individual experiencing them.

Living with HF demands a great deal of the individual, families, and care teams. Heart failure is taxing on patients and families, with both feeling the emotional, physical, and financial stresses of the experience. Complex medications requiring daily titrations, such as appropriate daily diuretic dosing, and strict adherence to dietary guidelines not seen by many members of society are only two examples of the multitude of obstacles before an individual living with HF (American Association of Heart Failure Nurses, 2015). The lives of persons with HF must be carefully managed to prevent exacerbation of HF. This includes many everyday challenges, from medication management to the proper balance of daily activities, and things as simple as reading a nutrition label. Any of these tasks may represent new challenges to individuals based on their unique backgrounds and histories. The HF disease process is one of progression and regression with periods of stability and relative improvement.

The complex, etiological pattern of HF has contributed to its status as the leading cause of hospitalization in adults > 65 years of age (Desai & Stevenson, 2012). HF often affects patients at a point in life when their ability to self-manage may be declining due to the presence of advanced age and multiple comorbid states (Hajduk et al., 2013). The incidence of HF increases with age from 0.3% among 20-39-year-old males to 14.7% of those 80 years of age or older (Bui, Horwich, & Fonarow, 2011). While HF is not exclusively a disease of the aged, prevalence is noted to increase with population age, and patients over the age of 65 have accounted for 71% of total HF-related hospital admissions between the years 2000 and 2010 (Centers for Disease Control and Prevention, 2012). Heidenreich et al. (2011) predicted that, by 2030, 40.5% of the United States population would have some form of cardiovascular disease manifested as hypertension, coronary heart disease, HF, or stroke. The ongoing increase in cardiovascular disease states and the increasing costs associated with their treatment has led the government to implement policies focused on the reduction and management of costs associated with these diseases.

Heart failure is challenging to live with; that seems apparent. The cost to the individual and to society for HF treatment is enormous and growing (Heidenreich et al., 2011). To appropriately respond to and mitigate the health issues and economic burden of this disease, it is imperative that a systematic and evidence-based approach be utilized to guide patients and their families toward optimal self-care and management strategies of HF. The experienced and trained heart-failure nurse has the exposure to heart-failure patients as a cohort and possesses knowledge specific to diet, medication, patient outlook,

and treatment that may best serve the needs of the patient and the treatment team (American Association of Heart Failure Nurses, 2015).

## Standard Care

Inpatient HF care was reviewed at one Eastern Montana healthcare facility of 230 beds as being representative of standard, inpatient care for HF. Standard care consisted of patients being given instruction on the signs and symptoms of HF exacerbation by their inpatient nurse, inpatient pharmacists providing medication education, and registered dieticians providing nutrition education (J. Riesinger, personal communication, May 21, 2017). Nurses provided disease education using a standardized format, though they themselves received no specialized training or instruction on how to standardize delivery of the material (J. Riesinger, personal communication, May 21, 2017). Smith and Hobbs (2015) state that the average patient being treated for HF has between five and seven medications. Pharmacists provide education about medications sometime prior to discharge depending on the time of day or day of week that discharge transpires, with staff from Cardiac Rehabilitation working to fill in during times of limited availability (J. Riesinger, personal communication, May 21, 2017). Finally, nurses ensure post-discharge follow-up appointments are made with patient's primary care providers, though follow-up to ensure appointments are being kept may be an opportunity for growth, as could opportunities for ongoing and additional contact between the hospital and the patient to review patient education following discharge.

The role of the registered nurse is crucial to the spectrum of care for persons with

HF. The registered nurse participates in medication reconciliation at hospital admission, conducts medication and disease education, and conducts activities designed to enhance patient self-care as demonstrated by recognition of signs, symptoms, and effective knowledge of nutrition and medication. Each of these activities enhances patient self-care abilities and improves their abilities to adequately manage their disease (Kent, Cull, & Phillips, 2011). The HF nurse is a position of vital importance within the continuum of HF care, and a position entrusted with ensuring that continuity of patient care extends from the moment of hospital admission into the post-discharge environment. The HF nurse fulfills patient-care needs within the spectrum of HF care, without which the system may fail and revert to the setting of ongoing excess readmission rates. Nursing fills critical roles within the continuity of HF care.

## Statement of Problem

When compared to current procedures, can the use of an HF nurse providing evidence-based patient education and post-discharge follow-up coaching reduce avoidable 30-day HF readmission rates at a 230-bed Eastern Montana hospital to the magnitude necessary to offset the costs of employing that nurse? Is it possible for a nurse to intervene within the spectrum of care of the HF patient to the magnitude necessary to offset the financial expenditures necessary to justify their own employment? Additionally, can this same position beneficially affect the financial bottom line of the facility while resulting in an improvement to patient care? Finally, can the utilization of a

specialist, HF nurse reduce the burden to patients and their families associated with HF exacerbation and readmission, as evidenced by improved patient quality of life?

## Purpose and Significance

The purpose of this project was to investigate how the use of a HF nurse within a hospital-based, cardiac-service line may decrease total service costs, while also decreasing observed HF readmission rates. In this scholarly project, the student investigated the potential benefits of a heart-failure nurse within a cardiac service treating patients with heart failure, investigating whether this person could generate a return on investment great enough to, at a minimum, offset the cost of their own employment and provide the grounds for the creation of this position within a facility not utilizing such a position within their continuum of cardiac care.

Healthcare facilities have been tasked with addressing and reducing the incidence of hospital readmissions that have been defined as avoidable or excessive. Diverse treatment and care modalities have been employed to improve patient care and decrease HF readmission rates. The complicated nature of home HF management has contributed to a national, 30-day readmission rate of 25% (Feltner et al., 2014) and six-month readmission rates exceeding 50% (Desai & Stevenson, 2012). The Centers for Medicare and Medicaid Services (CMS) have linked financial reimbursement for services rendered to hospital readmission rates for select, predefined conditions including HF and COPD, among others (CMS, n.d.). The American Heart Association, the American College of Chest Physicians (Yancy et al., 2013), and the American Association of Heart Failure

Nurses (2015) view HF as a disease that is increasing in prevalence and a disease that may have modifiable risk for readmission, as guideline-directed medical management has been shown to impact readmission rates (Yancy et al., 2013). In light of a certain percentage of readmissions being defined as modifiable, dependent upon the actions of treatment facilities, CMS has begun placing the onus for addressing these modifiable risks, the reduction of avoidable hospital readmission rates, onto respective treatment facilities. As the costs of most goods and services have increased, CMS has directed that cost overruns that can be lessened be appropriately addressed, to reduce avoidable HF readmission rates (CMS, n.d.).

Congress enacted the Patient Protection and Affordable Care Act, or the Affordable Care Act (ACA), which included the addition of section 1186(q) to The Social Security Act. Section 1186(q) established the Hospital Readmissions Reduction Program (HRRP) for Inpatient Prospective Payment System (IPPS) hospitals (Boccuti & Casillas, 2015). The HRRP directed CMS to address excessive hospital readmissions by removing some of the federal burden to pay for readmissions by declining to reimburse facilities for excess readmissions (Boccuti & Casillas, 2015). The HRRP required the CMS to reduce payments to hospitals demonstrating an excess of readmissions for selected diseases (CMS, n.d.). Acute myocardial infarction, HF, and pneumonia were the first conditions addressed using this system in 2012, with acute exacerbations of chronic obstructive pulmonary disease, total hip arthroplasty, and total knee arthroplasty being added to the list in 2015 (CMS, n.d.).

Reimbursement linked to predefined diagnosis-related groups (DRG) has required healthcare facilities to address modifiable risk proactively. Hospitals have aggressively focused on conditions with high readmission rates. CMS rule has considered any readmission within 30 days, regardless of cause (except certain planned procedures), to be readmissions that could contribute to reduced payments for the previously designated diagnoses (CMS, n.d.). In 2013, hospitals began to incur a 1% decrease in CMS reimbursement for the identified DRG if they exceeded the allotted readmission standard; this increased to 2% in 2014 and 3% in 2015, where it is anticipated that it will remain (Boccuti & Casillas, 2015). Reimbursement reductions translated to $428M in 2014 nationwide penalties (Boccuti & Casillas, 2015). Put simply, CMS defined an acceptable readmission threshold, beyond which readmissions were defined as excessive. Financial reimbursement was tied to this readmission rate, with excessive readmissions resulting in a reduction in government reimbursement for these cases.

Of the greater than 3,400 hospitals nationwide subjected to the Readmissions Reduction Program, only 799 performed at the level necessary to avert penalties for excessive readmissions during the 2016 fiscal year (Rice, 2015). In 2015, 38 hospitals nationally were subject to the maximum, 3% penalty (Rice, 2015). Between 2011 and 2014, five Montana hospitals were penalized at varying rates, with the largest, single-facility penalty being $395k (Talwani, 2015). Medicare.gov (n.d.) provided statistics for the years 2011-2014, detailing 401 HF discharges, with 58 readmissions and an excess readmission ratio of 0.8548 for one 230-bed Eastern Montana hospital. This hospital is the facility for which the pro forma later in this document was designed.

Qasim and Andrews (2013) used Healthcare Cost and Utilization Project (HCUP) Cost-to-Charge Ratios to convert total hospital charges into costs, reflecting actual expenses experienced in the provision of hospital care, including: wages, supplies, and utilities, and reflecting the amount a facility billed for an individual case. Costs to provide inpatient HF care were estimated at $11,100 per index, or initial admission, and an estimated national average cost of $13,000 per readmission (Qasim & Andrews, 2012). Using this value, readmission of 58 patients would equate to approximately $750k in associated patient costs. Titler, et al. (2008) provided an even higher computation of mean total charges, with findings of $15,293 per inpatient hospital stay for the treatment of HF. Additionally, CMS reimbursement for HF treatment often does not match charges, and hospitals lose, on average $1,000 per hospital stay for the treatment of HF (Titler, et al., 2008). Titler et al. (2008) account for 88% of charge variability via provider interventions, with each additional intervention adding $623 to total charges, each individual medication $179, each additional nursing intervention increasing charges by $289. Patient comorbidity contributes to the diversity of interventions and costs associated with HF care. Smith et al. (2012) described patients being concurrently treated for atrial fibrillation as incurring increased hospital charges of 15%, coronary artery disease 14% higher, chronic lung disease 29% higher, depression 36% higher, diabetes 38% higher, and hyperlipidemia as 21% higher than treatment for HF alone.

HRRP rule acknowledges and allows that a certain number of readmissions are unavoidable, and only seeks to address those defined as excessive (CMS, n.d.). CMS decreased reimbursement rates according to defined, acceptable, readmission levels

(CMS, n.d.). In the instance of the Montana hospital above, this amount was 0.88% of Medicare reimbursement totals, valued at $395k (Talwani, 2015). The loss of reimbursement due to potentially avoidable readmissions is an area that encourages focus on strategies to mitigate associated financial losses while improving patient care.

The cost of HF readmissions extends beyond the monetary, however. Each readmission means that the patient spends increased time as an inpatient and away from their homes. Patients are readmitted for treatment failure, edema, fluid retention, shortness of breath, ascites, increased oxygen requirements, orthopnea, and activity restrictions, all of which can be distressing symptoms for the patient, and disease exacerbations can necessitate return to the hospital for acute inpatient care (Feltner et al., 2014).

Improvements have been observed in patient comprehension and compliance with the complexities of long-term, chronic, HF therapies, with nursing providing dietary, medication, and lifestyle education and follow-up calls (Feltner et al., 2014). Nursing involvement has been shown to increase patient self-care knowledge, treatment compliance, and reduce hospital readmission rates (Dennison et al., 2011). Post-discharge follow-up phone calls have been found to reduce readmission rates by as much as 80% in one study (Baptiste, Mark, Groff-Paris, & Taylor, 2014). In their meta-analysis, Baptiste, Mark, Groff-Paris, and Taylor (2014) found that post-discharge phone follow-up allowed extended assessment of progress and answers for ongoing self-care challenges, leading to improved patient self-care and a marked reduction in hospital readmissions. “Nurse-led telephone-based post-discharge care is a significant nursing care approach” (Lee & Park,

2010, p. 1289). Lee and Park (2010) describe these important nursing-driven and telephone-enabled interventions as enhancing patient wellbeing by determining "[d]ifficulties with medication adherences or medical regimens" (p. 1289) and facilitating identification of complications that may have developed since hospital discharge. Lee and Park (2010) found hospital readmission rates to be diminished at the 3-, 6-, and 12-month points among the studies included within their meta-analysis.

The initial financial outlay necessary to adapt a cardiac-care program as described, and to retain staff specifically capable and responsible for instituting and executing the complexities necessary, may at first appear quite onerous. Rizzo (2013) put the cost of readmission in stark dollars and cents when the author related the cost associated with the average HF readmission of $13,000 to be 118% of the $11,000 estimated as the hospital bill associated with the average initial HF admission. Readmissions are viewed as more costly than primary admissions, though the reason is challenging to define. Additionally, HF readmissions are viewed as avoidable between 23.1 % (van Walraven & Forster, 2013) and 27% (Yancy, et al., 2013) of the time via patient-care avenues such as better medication adherence, better dietary adherence, and guideline-directed medical care. If a registered nurse is able to assist a facility to decrease their HF readmission rate, there may be a sizeable quantity of lost capital to recoup.

# CHAPTER TWO

# REVIEW OF THE LITERATURE

A diversity of resources was de rigueur in the synthesis of data and supporting evidence within this project, ensuring adherence to a sufficiently stringent standard of inclusion. Heart failure (HF) was investigated as a disease process, as was the treatment thereof. Quality-adjusted life years (QALY) were reviewed and included as a quantitative measure of HF impact. Finally, The Trajectory Model was assessed and included as the theoretical underpinning for the work.

## Databases Searched and Key Terms

Google Scholar was utilized extensively as a search engine with results limited, primarily, to those occurring since 2011. While Google Scholar itself does not contain many full-text articles, it can be linked to the Montana State University library where full-text articles can then be obtained. Full-text articles have been gathered from CINAHL, MedLine, PubMed, ScienceDirect, Web of Science, The Joanna Briggs Institute, and Cochrane. Additionally, the librarians at MSU have compiled secondary search groupings based on college and subject that were also employed in this search.

The MeSH Terms: heart failure and community health nursing or home health services, hospital readmission or telecommunications or rural health services or communication networks or telephone or telemedicine or monitoring ambulatory or monitoring physiologic were used in database searches and were combined with the

search terms: structured telephone support, telephone support, telephone monitoring, remote monitoring, heart failure education, and self-care heart failure. Additional search terms acquired during initial research included: myocardial failure, insufficiency cardiac, weak heart, and nurs*.

Articles selected for review were limited to those published in English and presented in a peer-reviewed journal. Systematic reviews, randomized-controlled studies, and cohort studies, regardless of size, were accepted to ensure studies of smaller size and numerically similar to this work would not be excluded.

## Heart Failure as a Disease

HF is among the list of chronic cardiovascular diseases that have been demonstrating an increased incidence and prevalence within the United States (Heidenreich et al., 2011). HF prevalence has been correlated with epidemiological trends related to both obesity and increased risk of chronic disease states, such as hypertension and diabetes, all of which are known cardiovascular risk factors ("CDC Facts," 2013). Heart failure is an extremely complicated, but treatable disease, that is responsible for profoundly negative health outcomes for individuals and dire financial repercussions for individuals, treatment facilities, and the entirety of the national financial landscape.

An examination of the causes attributed to HF healthcare readmission must first address the disease state itself. HF is a manifestation of disease extending from acute and chronic cardiac dysfunction, infection, renal disease, drug use, congenital malformation, and valvular dysfunction. The medications and therapeutic regimens used to treat HF are

often multifaceted and may require the involvement of a multidisciplinary care team. “HF is a complex clinical syndrome that results from any structural or functional impairment of ventricular filling or ejection of blood” (Yancy et al., 2013, p. e246). HF is staged based upon gradations of the disease using left ventricular ejection fraction (LVEF). HF with preserved ejection fraction (HFpEF) is defined as LVEF >50% and is sometimes referred to as diastolic HF, with HFpEF - borderline existing between 41-49% and HF with reduced ejection fraction (HFrEF), occasionally referred to as systolic HF and demonstrating LVEF <40% (Yancy et al., 2013). Yancy et al. (2013) note that, historically, nearly all randomized-controlled trials (RCT) have been conducted on HFrEF and, therefore, most interventions supported within the literature pertain primarily to LVEF <40%.

Several rating scales have been developed that have described HF symptoms, regardless of quantified LVEF. The scales have allowed for the assessment of patient symptoms and use of therapy independent of LVEF, allowing for HFpEF to be addressed using the methodologies originating with HFrEF. The New York Heart Association (NYHA) Heart Failure Functional Classification System described HF symptoms on a scale of I-IV, as follows:

I) No limitation of physical activity. Ordinary physical activity does not cause symptoms of HF.

II) Slight limitation of physical activity. Ordinary physical activity results in fatigue, dyspnea, or palpitations. Comfortable at rest.

III) Marked limitation of physical activity. Comfortable at rest, but less

than ordinary activity causes symptoms of HF.

IV) Unable to carry on any physical activity without symptoms of HF, or symptoms of HF at rest. (Yancy et al., 2013, p. e248)

HFpEF has become a topic of increased interest as research has found, of those presenting with clinical signs and symptoms of HF, between 40-70% have HFpEF (Yancy et al., 2013). HF is the manifestation of a variety of disease etiologies that can confound treatment and prognosis. Variation in patient presentation and disease manifestations can mandate levels of treatment personalization. This is where, and why, detailed care, employing the expertise of a nurse with specialized experience and qualifications, can be beneficial to address these nuances.

Smith and Hobbs (2015) stated that the typical pharmacologic therapeutic regimen for a HF patient consists of five to seven different medications. "[T]he cornerstone of medical therapy for patients with HF with reduced ejection fraction (HFrEF) or systolic HF is neurohormonal blockade" (Smith & Hobbs, 2015, p. 85). The term neurohormonal blockade speaks to the recommendation that patients with HF be prescribed a drug from the beta-blocker family, such as metoprolol or carvedilol, and their ability to blunt the action of hormones to stimulate and worsen the process of cardiac remodeling (Smith & Hobbs, 2015). Cardiac remodeling is the multifactorial, insidious process by which fluid is retained and the heart progressively balloons under an ever-present stretch and loses function as the stretched walls become thinner and less contractile (McCance & Huether, 2014).

Home treatment and management of HF requires astute attention be paid to medications, signs, symptoms, and diet. Cardiac medications can require complicated dosing schedules, interpretation of signs and symptoms, and some medications can require long-term monitoring. Signs and symptoms of exacerbation include fluid retention, as displayed by weight gain or edema, increased shortness of breath with common activities, nocturnal dyspnea, and having to sleep in a more upright position, among many others (Paul & Kirkwood, 2015). Compliance with complicated medication regimens has been identified as a barrier to effective self-care and patients can be dichotomized into one of two groups: those adherent to treatment protocols and those non-adherent to treatment protocols (Riegel & Carlson, 2001). A significant question that must be asked is whether the patient is failing to adhere to treatment regimens intentionally or due to the complexity of the treatment?

The question of patient motivation and adherence is important, as the methods a provider might employ to treat the first group may vary from those used for the second. Percival and Cottrell (2012) found patient perception of adherence correlated with their perceived need for HF treatment. Those who believed minimally in the necessity of the treatment were less likely to adhere to the treatment while those whose perception of need was higher were much more likely to remain adherent to treatment (Percival & Cottrell, 2012). The observant heart-failure clinician, as a part of the treatment team, could use knowledge of patient type to focus their efforts where they are most needed across the population of patients under their care. The patients who fully acknowledge their need for assistance will seek out care and adhere fully with treatment protocols and

goals, with little necessity for additional input from the clinician, while the patient who does not recognize, or fully comprehend their need for assistance, may require more focused attention from the treatment team.

Burke and Dunbar-Jacob (1995) found patient adherence to therapy plans occurred with varying levels of success, with the reasons for non-adherence being multi-factorial. Non-adherence may have arisen due to the complexity of the treatment plan, patient understanding of their disease and how it relates to the treatment plan, financial and time constraints, and the extent to which therapy requires a change in lifestyle (Burke & Dunbar-Jacob, 1995). The American College of Cardiology Foundation (ACCF) and the American Heart Association (AHA) have provided guidelines for the management and treatment of HF that account for the diversity of HF causes and the complexities of individual care (Yancy, et al., 2013). Most applicable to any work to improve patient periods of at-home wellness are the recommendations available in the ACCF/AHA guidelines, *Recommendations for Hospital Discharge*, each receiving a Level 1 Class of Evidence Score (best) and Grade B Level of Evidence score:

> 1. Performance improvement systems in the hospital and early post discharge outpatient setting to identify HF for Guideline-Directed Medical Therapy (GDMT).
> 2. Before hospital discharge, at the first post discharge visit, and in subsequent follow-up visits, the following should be addressed:
>  a. Initiation of GDMT, if not done or contraindicated;
>  b. Causes of HF, barriers to care, and limitations in support;
>  c. Assessment of volume status and blood pressure with adjustment of HF therapy;
>  d. Optimization of chronic oral HF therapy;
>  e. Renal function and electrolytes;
>  f. Management of comorbid conditions;
>  g. HF education, self-care, emergency plans, and adherence; and
>  h. Palliative or hospice care.

> 3. Multidisciplinary HF disease-management programs for patients at high risk for hospital readmission are recommended (Yancy et al., 2013, p. e289).

Planning for a successful discharge should begin well before the actual physical discharge, with preparation and coordination of care, optimization of medications, education, and maximization of renal function (Yancy, et al., 2013). Hospital discharge entails a complex series of events and requires a multidisciplinary team, with nursing serving as a key component within the total patient-care team. Bradley et al. (2013) further addressed methods at discharge to reduce 30-day hospital readmissions for HF, finding hospitals who partnered with local physicians and other local hospitals reduced readmission rates. Additional findings that benefitted readmission rates included: having nurses responsible for medication reconciliation and arranging follow-up appointments within one week of discharge, sending discharge paperwork directly to the patient's primary-care provider (PCP), and assigning staff to follow up on tests that do not result until after discharge (Bradley et al., 2013).

Dennison et al. (2011) investigated the effect of improved health literacy on patient self-care and hospital readmissions and found increased health literacy correlated with younger age and higher education level. Younger patient age and higher levels of education contributed to improved 30-day readmission outcomes, which identified the elderly and those with lower levels of education as populations who could particularly benefit from interventions designed to enhance health literacy (Dennison et al., 2011). By identifying those who may have higher or lower health literacy, the HF nurses, along with the treatment team, may use this information to effectively address individuals who may

require additional time and more focused interventions as compared to those who may have higher baseline health literacy. When applied across the spectrum of an entire program with finite time to accomplish all with which they are tasked, tools that concentrate efforts where they can be best utilized contribute to improved self-care of the HF patient. The role of the HF nurse within the treatment team is to assess and define specific focus areas to maximize their energies where they would be most effective.

Boyd et al. (2011) found improved self-care behaviors and quality of life among the results of studies examined by systematic review and issued the recommendation that HF education conducted as an attempt to improve health literacy begin prior to hospital discharge, or upon initial diagnosis, as a 1:1 educational intervention. Educational interventions for HF patients that begin at the initial diagnosis of the disease allowed for the progression, repetition of instruction, and greater opportunity for the patient to learn and internalize the necessary information to demonstrate effective self-care. The early education was thought to mitigate the progress of the chronic disease process.

Educational interventions as the only adjunct to promote self-care were found by Kent, Cull, and Phillips (2011) to be less effective than combined methods. Bradley et al. (2013) determined that any one solitary intervention did not impact readmission rates to the same extent as using a variety of combined interventions. Marked improvement was found as cumulative interventions, such as post-discharge follow-up calls, addressing patient coaching and education, including patient questions about disease, medications, and treatment, were added to inpatient education. The findings and recommendations within the ACCF/AHA guidelines recommended multidisciplinary HF management

teams, demonstrating decreased all-cause hospitalization and mortality by integrating a comprehensive follow-up team (Yancy et al., 2013). Thus, the added, cumulative benefit of multifactorial interventions expose patients to new information repeatedly, joining the inpatient and home settings, and returning improved care benefit yields as compared to one-off education presented to patients during acute-phase, inpatient illness.

Home care of an individual diagnosed with HF can range from the very simple to the extremely complex. Anker, Koehler, and Abraham (2011) proposed general progressions of remote HF monitoring, from systems that provide no real-time feedback or control, to fully automated systems capable of notifying providers, if necessary, and allowing for real-time modification of patient management. Supporting the possibility that simpler systems can perform on-par or superior to complicated, computerized systems, several meta-analyses have provided robust support for the concept of structured telephone support as an effective means of reducing morbidity and mortality among patients with HF (Clark et al., 2007; Inglis et al., 2010). Clark et al. (2007), with findings supported by Inglis et al. (2010) in a separate Cochrane review, found remote monitoring to reduce hospital readmissions by 21% while structured telephone support, in particular, was found to improve health-related quality of life.

The extent to which hospital readmissions are viewed as avoidable is a topic open to debate. Baptiste, Mark, Groff-Paris, & Taylor (2014) found that up to 80% of hospital readmissions may be avoidable, given appropriate post-discharge follow-up care, including patient phone calls and coaching. Yancy et al. (2013) suggested 27% of HF

readmissions may have been avoidable, while van Walraven & Forster (2013) suggested 23.1% of HF readmissions can be classified as avoidable.

## Quality-adjusted Life Years

The efforts of the HF treatment team, which includes a HF nurse assigned to follow the patient to support self-care practices, are designed to not only add years, but to enhance the quality of those years. This is encapsulated within the concept of the quality-adjusted life year (QALY). "QALY's are able to combine mortality and morbidity into one measure of health by weighting each of the years of life expectancy by the health-related quality of life" (Kane, 2006, p. 338). Using a scale of 0 to 1 as the spectrum of health, with death represented by 0 and complete health reflected at the other end by a 1, QALY is used to weight the spectrum of health and the interventions used to impact that spectrum. For instance, a patient living five years at what they would define as perfect health, would equal 5 QALYs, while a patient living five years at a level they would consider to be 50% of completely healthy, would only achieve 0.5 QALY per calendar year and would only accrue 2.5 QALYs in the five intervening calendar years.

Wouters, Naci, and Samani (2015) described the methods employed for determining QALYs as, first, randomly surveying members of society about how many years of life they would trade to be restored to a state of perfect health based on a certain medical diagnosis. Second, those who are living with a given condition are asked the same questions as the healthy population. Next, having computed the relative value of a year of life spent living with a given disease state, that value is multiplied by the expected

number of years lived in that state to estimate QALYs. Alehagen et al. (2008) determined QALY values for NYHA HF class I-IV of 0.77, 0.68, 0.61, and 0.50 respectively. This indicates that a year spent living as an NYHA class IV patient provides 50% of the quality of life when compared to that of a person living in a state of perfect health. If an individual with NYHA class IV computed as a QALY of 0.50 lived for five years with their disease at that level, it would compute as 2.5 QALYs based on the diminished quality of those years. QALY may initially appear as a complicated mathematical derivation of the disease process, but it truly provides a framework with which to appreciate the impact of a disease state on the experience of living and the positive effects to be gained when an intervention improves a person's quality of life. While a nonspecific example intervention may only increase the life of an ill person from six to seven years, if the person was previously living with a disease that reduced each year to a QALY of only 0.5 and that value is increased to 0.9, the QALYs associated with that life went from 3 to 6.3. This would represent a significant increase in quality of life for an individual's remaining days; making the implementation of strategies to prevent HF readmissions, such as those that would be implemented by a HF nurse as described in this project, important.

## Theoretical Background

Living with a chronic disease is not simply about learning new medications; not merely about processing the complicated pathophysiological etiologies that comingle to create a disease state. Living with a chronic disease is not only about adjusting and

modifying one's life around the disease. Living with a chronic disease is about all of these things together, plus many more. Strauss and associates developed The Trajectory Model to address chronic disease, which was later adapted by Corbin and Strauss (1991) as a model of disease management specific to nursing built with the belief that "[C]hronic conditions have a course that varies and changes over time. This illness course can be shaped and managed" (p. 156). The Trajectory Model details efforts to shape and manage the course of chronic disease and provides a framework in which patterns of patient health may be altered away from relative illness and toward patterns of relative health (Corbin & Strauss, 1991).

The Trajectory Model integrates with the concept of HF care by providing the grounded theoretical background distilled from both inpatient and outpatient care to direct the development of nursing research and practice (Corbin & Strauss, 1991). Shrewd disease management is demonstrated not only via diligent monitoring on behalf of the treatment team, but through the actions of an educated and aware patient. A patient educated about the signs, symptoms, treatment, and when to seek help is a patient who has heightened self-care abilities. The patient is then able to alter the trajectory of their illness, affecting their biographical identity over time and their abilities with everyday activities (Corbin & Strauss, 1991).

Corbin and Strauss (1991) describe the management of an evolving course as trajectory management; the result of the summative activities of the patient, their family, the healthcare team, and the treatment modalities employed. The Trajectory Model includes several major concepts: trajectory phasing and sub-phasing, trajectory

projection, trajectory scheme, conditions influencing management, trajectory management, biographical and everyday living impact, and reciprocal impact (Corbin & Strauss, 1991).

Trajectory phasing speaks to the numerous status changes observed over the course of an illness and is separated as: pre-trajectory, trajectory onset, crisis, acute, stable, unstable, downward, and dying (Corbin & Strauss, 1991). The pre-trajectory phase is the time before illness begins while trajectory onset indicates that signs and symptoms are present. The crisis phase occurs when patients are most likely to be initially seen as hospital inpatients, as the situation has become life threatening and requires immediate intervention (Corbin & Strauss, 1991). As the patient is treated, the patient proceeds through the phase of acute treatment and continues on to a state where disease is stable. While the phases of the model may proceed in multiple directions and show progression and regression, displaying a process that may not proceed from step one directly through step eight, the patient may become unstable if the patient cannot be effectively controlled medically. The patient may enter the downward phase of progressive deterioration before dying, the final phase (Corbin & Strauss, 1991).

Trajectory projection is the vision of the progression of a disease and includes evaluation of the following: (a) is the disease expected to worsen? (b) will it get better? (c) is the disease expected to improve radically and markedly given a particular intervention, or (d) will it only improve somewhat? Trajectory projection requires the provider to consider a multitude of interwoven factors based upon the patient and their biographical data, the participation of the family support system, the combination of

therapies being prescribed and utilized, and the length of the disease, treatment, and life of the patients (Corbin & Strauss, 1991).

Pertinent to the use of The Trajectory Model to guide HF management is the trajectory scheme, where the healthcare team endeavors to "(a) shape the overall illness course, (b) control any immediate symptoms, and (c) handle disability" (Corbin & Strauss, 1991, p. 163). By manipulating the trajectory scheme for HF patients at a 230-bed Montana hospital using a HF nurse, this work is aimed at modification of the trajectory for HF patients at the phases of onset, stable, unstable, to mitigate the phases of crisis, and improve quality of life during the disease process,

Conditions that influenced management as described by Corbin and Strauss (1991) are anything that affect how and to what extent a trajectory scheme is executed. This is often related to the technology available, the cost, the duration of support, and the types of support employed. Furthermore, resources such as time and money, past experiences, motivation, setting, lifestyle and beliefs, interactions, and relationships can all influence management of chronic illness (Corbin & Strauss, 1991). Factors that influence management can be global, such as politics or season, or as immediate as the language spoken by the patient.

The manner in which the patients conducts their daily lives may positively or negatively affect treatment efforts, which represents another point at which the insertion of a HF nurse and communication from the inpatient treatment team may seek to affect trajectory and affect the trajectory phase management. A HF nurse is key to performing

what Corbin and Strauss (1991) referred to as limitations management, or streamlining and addressing the alterations in daily activities resultant from the chronic disease state.

Finally, reciprocal effect was described by Corbin and Strauss (1991) as the realization and acknowledgement that treatments may have consequences, and, through this consciousness, the HF team must address and minimize those consequences. Considering the negative, in addition to the positive, consequences of a treatment modality or when integrating multiple therapeutics may minimize deleterious compounding of the combined therapies.

The Trajectory Model maintains that, as a patient lives with a disease, very little self-care adaptation management occurs in the hospital; rather, the self-care management changes occur at home at the hands of the patient and their family (Corbin & Strauss, 1991). This concept is supported by the expanded clinical-care focus described by Hersh, Masoudi, and Allen (2013), which brought post discharge under the purview of the admitting facility, allowing for greater potential to affect disease course and pattern at the hands of the discharging medical facility. While facilities are often unable to retain patients for as long as they would like, acknowledging the utility and educational opportunities present within the outpatient, post-discharge environment affords for an ongoing environment of care and greater potential to affect disease trajectory.

Divided into a five-step process, The Trajectory Model provides a detailed course of action for analyzing and affecting trajectory modulation. The steps of the process are: locating the client and family and setting goals, assessing conditions influencing

management, defining the intervention focus, intervention, and evaluating the effectiveness of the intervention (Corbin & Strauss, 1991).

The first step in The Trajectory Model, locating the client and family and setting goals, tasks the nurse with identifying problems the patient may be having managing their disease and, by doing so, provides a logical basis and grounds for intervention (Corbin & Strauss, 1991). When locating the patient, and specifically identifying management shortfalls, the nurse must ensure they are addressing illness, biography, and everyday life activities, and that they measure and account for the reciprocal nature of these quantities (Corbin & Strauss, 1991). Patient history and beliefs can affect goal setting at this stage. Is this the patient's first HF admission or their fifth? The methods and tactics employed later in the process may vary depending on the patient's history. If this is their first setback and their first readmission, they may require an approach unlike that used for a fifth readmission. Methods utilized may differ substantially in patients with diverse biographies and a personalization of therapy will certainly be warranted.

The second step of the process, assessing conditions influencing management, analyzes variables that may be manipulated during the management process. Do they have a robust support network at home and sound understanding of disease processes, medications, and nutrition? Does the patient have access to resources such as time, money, and technology? These are all examples of simple measures that may profoundly affect goal setting.

The third step of the Corbin and Strauss (1991) model is to define the focus of the intervention. Which conditions and factors does the HF treatment team seek to

manipulate? Perhaps it is assessed that the patient has inadequate knowledge or inaccurate nutritional beliefs and these factors are found to be contributory to disease exacerbation and hospital admission. The HF treatment team, in concert with the work of the HF nurse, can specifically seek to address these items in an educational intervention.

Next, the fourth step of the model is the intervention itself. Following location, assessment, and focusing of the intervention, the model directs the actual intervention. Using a HF nurse in this step, to evaluate the effectiveness of the intervention, may be ongoing and interwoven over a period of time. For example, assume that during the assessment phase a patient is found to have limited abilities recognizing signs and symptoms of HF exacerbation. The HF nurse provides education on these items and then conducts follow-up phone calls post-discharge that serve as a feature of the intervention itself by affording the nurse and the patient the opportunity to discuss signs and symptoms of exacerbation. A subsequent phone call by the HF nurse may be used to evaluate the effectiveness of the educational intervention

Using the Trajectory Model as a guide, this project will investigate the feasibility and supportability of employing a full-time registered nurse with specialized knowledge of HF as a means to minimize HF readmissions. By juxtaposing potential cost savings in the form of prevented readmissions against the cost of employing a specialized registered nurse, this project seeks to investigate the benefits of the nurse and the enhanced capabilities this will afford the care team. The effective time-under-care will increase as a result of the ongoing contact with patients and the additional duration of cognitive-behavioral education.

With these factors in mind, the cognitive-behavioral empowerment and increase in health-state knowledge afforded by ongoing monitoring and management of HF patients by a specialist HF nurse who conducts inpatient education and outpatient follow up, appears to be a high-yield modification within the care continuum. Patients will be brought beyond the 30-day CMS readmission threshold with an enhanced capacity for self-management and heightened ability to remain in a state of health and self-empowerment from home. This would be noticed by the facility as a decrease in HF readmission rates. Patients will be delivered from a state of self-care deficit to a state of efficacious self-care via an alteration in their illness trajectory.

## In Summary

Heart failure is a disease with complicated and insidious etiologies that vary greatly from person to person. However, the treatment and course of the disease, the trajectory of the disease, can be modified by HF nurses qualified to address these complicated issues. The high hospital readmission rates observed among those diagnosed with HF have been shown to respond favorably to educational interventions, and to decline even further when paired with post-discharge, phone-based, follow-up care using the Trajectory Model to address patient disease state and positively impact disease trajectory.

# CHAPTER THREE

# METHODS

The purpose of this project was to investigate how the use of a heart failure (HF) nurse within a hospital-based, cardiac-service line may decrease total service costs, while also decreasing observed HF readmission rates. The potential benefits of a HF nurse within a cardiac service treating patients with HF was investigated, as was whether this position could generate a return on investment great enough to offset the cost of their own employment. The best evidence was examined in Chapter Two, before seeking data specific to a representative facility to construct a comprehensive pro forma that could describe potential savings and expenditures associated with the HF nurse inclusion within the HF care team. National patient cost averages as well as locally available data were compared and synthesized to form a more complete whole.

## Ethical Issues

To the greatest extent possible, the information used in this project was de-identified of facility names and locations. With individual research and cross-referencing, it may be possible to identify facilities that were specifically examined, and this could not be avoided if any real-world data were to be used. Facility de-identification served to preserve the work in a state of greater universal applicability and worked to provide benefit while avoiding harm.

The student met with, and received, an expedited institutional review from both

the Montana State University Institutional Review Board (IRB) on November 9, 2016, Appendix A, and the IRB for Billings, Montana on February 20, 2017, Appendix B, as no patient interaction was necessary. Both IRBs granted this project a waiver from full board review after determining that no individual, personally identifiable information would be recorded or used. While certain institutional-specific material was used, efforts were made to remain anonymous with respect to healthcare facility.

## Design

This scholarly project was a prospective, process-improvement project based upon review of current literature, as well as an examination of the current processes at a 230-bed, Eastern Montana hospital as described under Setting below. HF nurses exist at many facilities throughout the United States as an integral piece of the spectrum of heart-failure care, while other facilities have not adopted the HF nurse within their cardiac-care continuum. The student developed a pro forma to project potential costs and savings available to facilities upon altering their cardiac care continuum by adopting a dedicated HF nurse within their care model. Additionally, the pro forma expanded upon the potential benefits of improved quality of care provided to HF patients and diminished financial repercussions via decreased readmission rates.

## Sample and Setting

An actual sample of individual participants was not used in this project. Individual patient data drawn from one sample hospital were examined and included

adult patients over the age of 18 with a medical diagnosis including any stage of heart failure as defined by the New York Heart Association (NYHA) residing within the states of Montana, Wyoming, North Dakota, and South Dakota treated at a 230-bed Eastern Montana, inpatient healthcare facility (Yancy et al., 2013). This project focused on cost-effective nursing interventions deemed applicable and appropriate for Montana, a region the Montana Census and Economic Information Office (n.d.) lists as the 48$^{th}$ state in the union with respect to population density, at only 6.5 people per square mile.

The setting for this project was a 230-bed, inpatient healthcare facility in an urban center in Eastern Montana. In order to be an appropriate setting for this project, the facility had to have a defined cardiovascular-service line, including care for HF patients, and not currently utilize a specialist, heart-failure nurse as described herein.

## Detailed Procedures

A number of data points were necessary to appropriately implement this project. To discern the efficacy of an HF nurse working to decrease the incidence of unplanned, avoidable, 30-day HF readmissions, the effects and results of standard care (which this project defined as HF care without a dedicated HF nurse educator engaging in post-discharge follow-up calls) were assessed. The first information obtained was readmission rates using current practices. These data included the gross number of HF admissions, the gross number of readmissions, and a derivative readmission rate that was available from these numbers. As readmission numbers have been reportable values following the implementation of the Hospital Readmissions Reduction Act (HRRA), the most

expeditious means to acquire them was to query a representative hospital for the numbers they have reported (CMS, n.d.). The average billable patient costs per admission and readmission were included with data specific to the healthcare facility. National averages and hospital-specific values were both obtained for comparison. Additionally, fair market cost to employ a registered nurse possessing the experience, skills, and abilities necessary to execute the tasks described in Appendix D was proposed, based on Department of Labor data. Literature was reviewed for an evidence-based example of tasks and responsibilities incumbent upon the proposed HF nursing position. A viable HF nurse job description was found in the literature (Appendix E). This material was not designed for this project. An internet search was conducted for job descriptions of similar positions at other facilities. An appropriately comprehensive example was available and used in a relatively unchanged manner, save adapting the position to the facility-specific core values and to tailor the position to the locally-defined corporate material (Appendix E).

After numerical data representing the costs for unplanned HF readmissions and nurse employment were obtained, a pro forma was constructed that answers and addresses the problem statement. The pro forma was constructed to display a five-year forecast comparing and contrasting the possible costs and revenues associated with standard care and the proposed practice change. Specifically, the goal impact on avoidable readmission rates was built upon the work of van Walraven & Forster (2013) using a maximum potential readmission reduction goal of 23.1% of total HF readmissions as being available to recoup from total HF readmissions.

Table 1 includes a brief plan detailing the implementation of a HF nurse at a facility not currently using one within their care model. The plan extends from baseline research of the position, moving into the development of a pro forma for the position and a rough plan for position phase-in.

Table 1: Steps to CHFN Implementation

1. Conduct literature review for evidence of current best practices.
2. Conduct comparison/contrast between current practices at representative facility and best practices.
3. Compile readmission values for representative facility.
4. Construct pro forma detailing an evidence-based forecast of costs and savings available via adoption of best practice and model-of-care change.
5. Seek implementation approval by the facility, which would require buy-in from the resident cardiovascular-services team and the adoption of outpatient protocol orders for use by the CHFN to effectively triage outpatient contacts.
6. Implement a progressive phase-in, with individuals assigned to the outpatient HF-care team at hospital admission for treatment of HF.

The position of the HF nurse was built upon the current, best evidence addressing the effect of nurses providing similar care at representative facilities. The tasks and duties of the position were defined based upon items deemed necessary within the literature. Then, a job description was constructed which supports those ends. Once a job description meeting the requirements of best evidence to achieve the desired outcome of potentially reducing readmissions by a numerical value great enough to compensate for the existence of the nurse specialist position was created, it was weighed against the true cost of HF readmissions on an annual basis. The comparison between standard practice and practice with the integration of a HF nurse determined whether the HF nurse

conducting inpatient education and outpatient follow-up created a financial offset great enough to balance moneys expended in their salary and benefits package.

A definition of the scope of tasks and responsibilities deemed necessary to achieve the level of effect on HF readmissions necessary to offset the addition of a HF nurse was found. A position at a comparable facility was beneficial as a baseline means of defining the potential HF nurse position. A position description was obtained and modified to fit best practice and contains: creation and provision of inpatient HF education, creation and provision of outpatient HF education, tracking and contact, and acquisition and maintenance of HF-specific credentialing and certification.

Current admission and readmission rates associated with the HF program at a 230-bed, Eastern Montana hospital were collected and used to project the effects proposed using the CHFN, according to the literature available. The literature supporting benefit gained by reduced HF readmissions was used to justify the funding of the specialist nurse whose directive will be to mitigate these readmissions and return lost capital to the parent facility.

## Analysis

Following the collection of current costs of standard care, that is, care conducted without a dedicated HF nurse within the cardiac care team, a five-year projection of potential costs was constructed, using evidence acquired and supported within the literature review. Specifically, and key to the assumptions of the pro forma developed for analysis for this project, the research of van Walraven and Forster (2013) was used to

compute the percentage of HF readmissions which may be responsive to actions by the care team to assuage and alleviate readmission excess. Standard care and modified care utilizing a HF nurse were forecast alongside one another for five years into the future. These two data sets were then descriptively analyzed. The financial forecasts were plotted into trend-lines, establishing costs and losses that were compared directly.

# CHAPTER FOUR

# FINDINGS

The purpose of this project was to investigate how the use of a heart failure (HF) nurse within a hospital-based, cardiac-service line may decrease total service costs, while also decreasing observed HF readmission rates. The potential benefits of a HF nurse within a cardiac service treating patients with HF was investigated, as was whether the position could generate a return on investment to offset the cost of the position. The result of this project demonstrated trends supporting the economic value of a HF nurse as part of a HF treatment team.

## Findings

Heart-failure readmission data were obtained from a 230-bed hospital in Eastern Montana. The facility has a defined cardiovascular-service line, including care for HF patients, and does not currently utilize a HF nurse. Raw data representing admission and readmission data were obtained from a nurse practitioner within the cardiovascular service line, as compiled by that department and are presented in Table 2.

Table 2: Raw Data for Facility-Wide Admissions and Readmissions

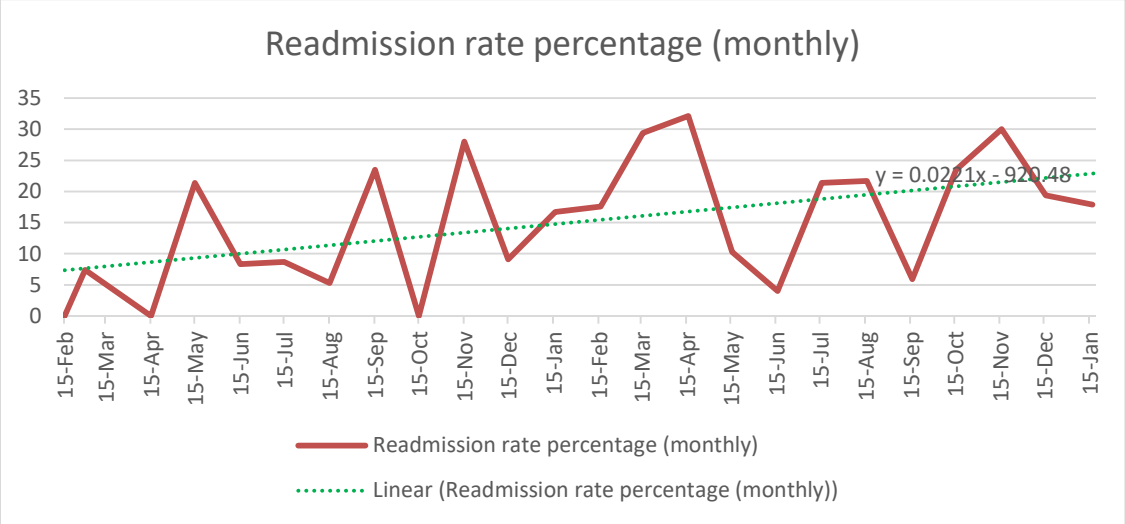
| Discharge Month | Heart failure admissions | HF Readmissions From Preceding Month | Readmission Rate (%) |
|---|---|---|---|
| Feb-15 | 20 | 0 | 0 |
| Mar-1 | 27 | 2 | 7.4 |
| Apr-15 | 17 | 0 | 0 |
| May-15 | 28 | 6 | 21.4 |
| Jun-15 | 24 | 2 | 8.3 |
| Jul-15 | 23 | 2 | 8.7 |
| Aug-15 | 19 | 1 | 5.3 |
| Sep-15 | 17 | 4 | 23.5 |
| Oct-15 | 21 | 0 | 0 |
| Nov-15 | 25 | 7 | 28 |
| Dec-15 | 22 | 2 | 9.1 |
| Jan-16 | 24 | 4 | 16.7 |
| Feb-16 | 17 | 3 | 17.6 |
| Mar-16 | 17 | 5 | 29.4 |
| Apr-16 | 28 | 9 | 32.1 |
| May-16 | 29 | 3 | 10.3 |
| Jun-16 | 25 | 1 | 4 |
| Jul-16 | 28 | 6 | 21.4 |
| Aug-16 | 23 | 5 | 21.7 |
| Sep-16 | 17 | 1 | 5.9 |
| Oct-16 | 17 | 4 | 23.5 |
| Nov-16 | 30 | 9 | 30 |
| Dec-16 | 31 | 6 | 19.4 |
| Jan-17 | 39 | 7 | 17.9 |
| Average | 23.66 | 3.71 | 15.10 |

These numbers represent the raw, unplanned, 30-day readmission rates for HF exacerbation in the setting of care not utilizing a centralized HF nurse to conduct education and follow-up telephone calls within the facility. Breaking the available 24-month data into 8-month increments, the first third, from February, 2015, to September, 2015, had an average readmission rate of 9.33%. The next third, from October, 2015, to May, 2016, displayed an average readmission rate of 17.9%. The final third of the

available data, extending from June, 2016, to January, 2017, experienced an average HF-readmission rate of 18.0%. The average readmission rate for the 24-month period was 15.10%.

A trend-line of local readmission rate percentages was modeled using Excel, shown as a dashed line in Graph 1: 24-month Readmission and Trend Analysis, below. The trend-line for readmission data has a shallow, though positive, slope with the equation of the trend-line, using readmission rates as the y-axis, values above the calendar months in question as the x-axis, of $y = 0.0221x - 920.48$. This trend-line was generated using the "Add Trendline" function and using the data set composed of calendar month as the x-axis variable and the readmission rate percentage from that month as the y-axis variable. Please note that, while both the raw readmission numbers and the readmission rates display great month-to-month variability, the trend-line established by avoidable, 30-day HF readmission rate percentages clearly displays an increase in readmission rates between January, 2015, and January, 2017.

Graph 1: 24-month Readmission and Trend Analysis




## Tools Created to Aid Implementation

A presentation was constructed (Appendix D) detailing the possible costs and benefits to a facility electing to modify an existing cardiovascular-services line via the inclusion of a HF nurse. A job description (Appendix E) detailing physical, educational, and experiential abilities likely to match with an appropriately qualified candidate was acquired via internet search to meet the needs and intents of the available best evidence. These documents are included as tools to aid any potential future transition of this work from professional project to real-world application.

## Pro Forma, Explanation of Costs and Savings

The national average salary for registered nurses of $67,400 was used to broaden potential project applicability, and the addition of insurance, retirement, and other items necessary to create a comprehensive job offer may total over $100k (“Occupational

outlook," n.d.). Defining the moneys necessary to procure personnel with a Master of Science in Nursing, Certified Heart Failure Nurse credential, Advanced Cardiac Life Support certification, minimum two years of experience working with a cardiac patient population and physical capabilities necessary to conduct the tasks detailed in Appendix D and Appendix E can be accomplished using current fair market value. The resulting return on investment is more challenging to define, short of full implementation.

Table 3: CHFN Pro Forma

| | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 |
|---|---|---|---|---|---|
| **Cost of CHFN** | | | | | |
| Salary with 3% annual increase over first 5 years | $65,300 | $67,259 | $69,277 | $71,355 | $73,496 |
| Benefits computed as 25% salary | $16,325 | $16,814 | $17,319 | $17,838 | $18,374 |
| Total Compensation | $81,625 | $84,073 | $86,596 | $89,193 | $91,870 |
| | | | | | |
| **Cost of Admissions** | | | | | |
| HF Admission Raw Totals (Using 2016 data, with admission rate projected to grow at 5% per year.) **standard care** | 235 | 246 | 258 | 271 | 285 |
| HF Readmission Rate **without** CHFN in place (projected at 5% growth annually) **standard care** | 15% | 15.75% | 16.54% | 17.36% | 18.23% |
| Actual Cost Per Patient (Using 2016 data as baseline and assuming 5% annual growth) | $6,694 | $7,029 | $7,380 | $7,749 | $8,136 |
| Total Estimated facility HF Financial Cost | $1,573,090 | $1,729,134 | $1,904,040 | $2,099,979 | $2,318,760 |
| **Cost of Readmissions** | | | | | |
| Raw readmissions (projected admission total x projected avoidable readmissions rate) | 35 | 38.75 | 42.67 | 47.04 | 51.95 |
| 23.1% of gross avoidable readmissions viewed as preventable readmissions | 8.08 | 9 | 9.86 | 10.87 | 12 |

Table 3: CHFN Pro Forma Continued

| | | | | | |
|---|---|---|---|---|---|
| Cost associated with preventable unplanned readmissions (Raw readmission x estimated cost per patient) | $54,087.52 | $63,261.00 | $72,766.80 | $84,231.63 | $97,632.00 |
| **Total Savings** | | | | | |
| Moneys lost to avoidable readmissions, less CHFN total compensation | -$27,537.48 | -$20,812.00 | -$13,829.00 | -$4,961.00 | $5,762.00 |
| 5-year savings by employing CHFN = total of all years | | | | | -$61,377.48 |

The pro forma described costs and benefits computed over a five-year span comparing and contrasting parallel treatment avenues, one employing standard care and the other employing the HF nurse, both built using the baseline admission and avoidable readmission data obtained by analyzing care in the absence of a HF nurse conducting telephonic patient follow-up and coaching, and projecting that data into the future using a 5% annual growth rate, against the potential costs and savings associated with the HF nurse. This growth value was chosen to represent a conservative level of expected increase in disease prevalence. Using 5% growth in HF incidence, as well as a 5% annual inflation in cost to treat, the expected number of gross HF cases increased from 235 at baseline in 2016 to 285 after five years, while the cost to treat increased from $1,573,090 to $2,318,760 total.

The projected readmission rates computed in the pro forma rose from 15% in 2016 to 18.23% at five years. Each year was computed using a 5% annual readmission growth rate from the year prior. With the cost to treat increasing along with the readmission rate, the total dollar cost to treat readmitted patients rose from $54,087.52 to $97,632.00 over the five-year forecast.

Next, an intentionally conservative readmission-reduction forecast was constructed to demonstrate the potential impact of the HF nurse. The potential impact on avoidable HF readmissions was projected as a range of values, from 23.1% of total HF readmissions being available to recovery, as proposed by van Walraven & Forster (2013), the 27% potential reduction in avoidable HF readmissions proposed by Yancy, et al. (2013), up to the 80% potential reduction in avoidable HF readmissions proposed by Baptiste, Mark, Groff-Paris, and Taylor (2014). The decision was made to pursue the most conservative potential impact of any intervention, the 23.1% reduction in avoidable HF readmissions proposed by van Walraven & Forster (2013), so that resultant data be seen as conservative, rather than potentially artificially and implausibly inflated. That said, the pro forma assumed that 23.1% of forecast HF readmissions were potentially avoidable each year and sought to recover the entirety of that 23.1%. Over the course of the five-year forecast, the program initially lost money, as the cost to treat the number of avoidably readmitted HF patients remained low, before the cost to treat the 23.1% of patients available for correction intersected and the program began to demonstrate a positive return on investment. The pro forma demonstrated a forecast loss of funds of $27,537.48 in year one, though the loss decreased each year, before demonstrating a positive return on investment of $5762.00 in year five.

Finally, ongoing cost savings experienced by the reduction in HF readmissions were compared to the projected numbers from the model absent the HF nurse. Annual costs were compiled over the course of the five-year pro-forma projection. The total five-year cost savings was found to be a loss of $61,377.48 dollars. This value was computed

as a reflection of moneys spent to treat avoidable HF readmissions, whether that money was above Centers for Medicare and Medicaid Services (CMS) penalty threshold, or whether it could simply be viewed as an avoidable expenditure on the provision of HF care. It bears note that, while the cost of employing a HF nurse as described is a relatively fixed cost, less cost of living and merit pay increases, the impact of treating persons with HF is likely to continue to increase, offsetting the initial fiscal imbalances in the program over the long-term financial forecast.

A real and tangible difficulty in presenting an academic project as a process-improvement initiative for a real-world facility, with budgets and finances that must be addressed, is that money is not an infinite resource. Despite the apparent benefits available via the enhanced level of care afforded by diversifying the delivery of heart-failure care, an initial financial outlay is unavoidably necessary. The Bureau of Labor and Statistics describes the average salary for Registered Nurses as $67,490, with the lowest 10% earning $46,360 dollars and the highest 10% garnering $101,630 annually ("Occupational outlook," n.d.). As it is truly impossible to provide a valid guess as to a final negotiated reimbursement package, one can only use the available averages to speculate that an experienced, critical-care nurse, possessing additional experience and certifications, may require a financial commitment at least on par with the $67k national average. Efforts were made to determine comparable reimbursement for a similar position, in a similar facility. The HF nurses in a comparator facility were found to be paid hourly, on par with nurses in other specialties, based on years of experience, though the nurses working as HF nurses all had very great chronological experience, with several

at the extreme end of the pay scale, over $40/hour and over 30 years nursing experience (J. Wanner, personal communication, February 26, 2018). As such extreme levels of nursing experience were not explicitly described by this project, national averages were chosen to enhance generalizability.

# CHAPTER FIVE

## DISCUSSION AND CONCLUSION

The potential for financial savings reveals itself as a trend over the course of a five-year prospectus, though the complexity of obtaining the full perspective of potential impacts may be an area for future examination. The impact of an enhanced heart failure (HF) service line falls within a broad spectrum, potentially from 23.1% of total readmissions being amenable to modification (van Walraven & Forster, 2013) through up to an 80% reduction in HF readmission rates (Baptiste, Mark, Groff-Paris, & Taylor, 2014). A reduction in avoidable HF readmissions was demonstrated in the results of this project, supporting the forecast trend in savings associated with the treatment of HF. The position of the certified HF nurse was found to have the potential to reduce the monetary impact of HF readmissions.

The HF nurse is central to the spectrum and continuity of HF care, tasked with the integration of inpatient and outpatient services, and improving the HF patient's opportunities for improved disease management following acute hospital discharge. The medical treatment of HF, though a lengthy and ongoing process, has shown to be responsive to interventions designed by a HF team. A medical condition that displays a chronologically brief course may be more likely to respond to the efforts of an acute, therapeutic regimen prior to complete resolution of the problem, while a disease process as complicated as HF may require many, and ongoing, interventions. A challenge of HF is that this immediate resolution does not occur. Instead, management must continue for the remainder of an individual's life. While the duration of therapy may appear

problematic, this long-term span of therapy provides a surfeit of opportunities for employment of therapeutic interventions.

Graph 1: 24-Month Readmission and Trend Analysis displayed very great month-to-month variation. The specific reasons for this were outside the scope of this project, but could potentially reflect the real-world, medical impact of seasonally-dictated diet. For instance, if individuals have greater difficulty abstaining from Christmas ham than ham in June, sodium derived fluid retention could spike at different times of the year. Also, there was a very substantial turnover of personnel within the cardiac service line during the period for which data was available, which could also reflect itself in readmission rates.

## Heart-Failure Nurse Impact

Amongst the challenges involved with the treatment of HF, there are also a great number of opportunities to produce positive change. A message of hope became apparent at many different points within the completion of this project. While the data suggested that patients being treated for HF at the healthcare facility studied have a 1 in 4 chance of being readmitted within 30 days of hospital discharge, there are opportunities where constructive, cost-effective, positive changes could be made to reduce these odds. As a disease that negatively affects lives, every effort to minimize and mitigate this impact must be made, and simply achieving national averages cannot be viewed as acceptable. National averages represent a measure, not the goal. Also, the Healthcare Readmission Reduction Program (HRRP) mandates that elevated readmission rates are not acceptable

(CMS, n.d.; Feltner et al., 2014). Even when presented with readmission rates on par with national averages, key process improvements can be improved.

The data forecast within the pro forma for this project displayed room for improvement. Facilities not employing a HF nurse stand not only to recoup lost capital, but to improve the quality of life of the patients they serve. Baptiste, Mark, Groff-Paris, and Taylor (2014) found that post-discharge, follow-up phone calls reduced hospital readmissions by as much as 80%. While other available studies support more conservative estimates of around 25%, there remains a goal of much loftier potential to positively impact patient lives (Yancy, et al., 2013; van Walraven & Forster, 2013).

When considering savings forecasts, it must be noted that the 24-month HF readmission rate was 15.06%, though this average may have been artificially low and possibly not representative of the current day due to the first third data displaying a readmission rate that was roughly one-half the rate computed for the most current third. An intervention that is able to sway the readmission rate of a HF disease with a 25% 30-day readmission rate by 23-80% is, therefore, quite substantial, given the lower or higher possibility. Additionally, Baptiste, Mark, Groff-Paris, and Taylor (2014) described a national average cost of approximately $13k per HF readmission, meaning the prevention of just over five readmissions would recoup the employee's salary and the prevention of just under eight readmissions could account for salary and benefits. Given the example from the literature review in which a single hospital was penalized $395k for an excess of hospital readmissions between the years of 2011 and 2014, the heart-failure nurse could, conceivably, have mitigated this loss and enabled the facility to recoup all moneys

invested in the creation of the job. Locally available numbers were more conservative, but the national data serve to expand the frame of reference and potential applicability of this single project to show how very substantial these types of interventions may be, if applied with ubiquity. Given the more conservative, 23.1% impact on avoidable readmissions, the HF nurse may not begin to recoup facility dollars until their fifth year, but the return of patient quality of life, begins on day one.

While it will likely require a financial commitment greater than $67k annually to employ a HF nurse, it is possible that the facility has the potential to offset this cost through realized savings in penalties incurred by reducing avoidable HF readmissions. Decreased hospital readmissions and the possible avoidance of Centers for Medicare and Medicaid Services (CMS) reimbursement penalties could yield a net cost savings that would mitigate any losses associated with the creation and hiring of a new registered nurse position. Using the previously mentioned CMS readmission penalty of $395k incurred during the period between 2011 and 2014 alone, this would equate to an annual salary of $98.75k (Talwani, 2015). This estimate could pay the $67k national average salary for a registered nurse by itself. It is challenging for improvement scientists, patients, and treatment facilities alike when the path to provide the care all parties desire requires steps and funds that are not available, despite a mountain of good intentions and evidence-based research. Assessment of the available data supports patient education and follow-up, with both quality of care and financial parameters being potentially positively affected.

An additional measure of the impact of a HF nurse conducting inpatient education

and ensuring patient follow-up phone calls are made at strategic points within the post-hospital framework, is a concept spoken to earlier, the quality-adjusted life-year (QALY). Recall that a patient living with HF can be thought to have a year that is of a reduced quality as compared to a year spent living without HF. Alehagen et al. (2008) established QALY values for New York Heart Association (NYHA) HF class I-IV of 0.77, 0.68, 0.61 and 0.50. Using hospital readmission as a measure of disease burden and, therefore, quality of life, it might be said that this would indicate that, via the reduction in readmissions, QALYs have been returned to individuals, and a great many QALYs have been returned to the communities in which these individuals reside.

## Implications for Practice

The implications for practice demonstrated by the inclusion of a specialized HF nurse within the HF care model are clear. The HF care team that includes a specialized and task-devoted HF nurse is likely to save money via the recoupment of monies lost to readmission excess, and patients treated at that facility are projected to have better outcomes and a higher quality of life in the post-discharge environment. The integration of nursing theory and nursing practice can contribute to a trajectory modification in the lives of patients, leading to improved outcomes for both patient and treatment facility, as measured in dollars and cents expended in the provision of care and in enhanced disease treatment and refined quality of life for patients and their families.

## Implications for Research

The body of research addressing the allopathic treatment of HF is certainly growing, with new medications being released with some regularity, while research regarding nursing and lifestyle interventions for the treatment of HF could perhaps benefit from the randomized, controlled application of projects such as the project described herein. The nursing-theory-directed expansion of HF treatment utilizing nursing-focused interventions and care modifications could benefit HF care, as they may yield lower-cost applications than those originating via the allopathic care model.

## Limitations

Readmission forecasts are, at best, an opportunity to make an educated guess about the future. The spectrum of potential impact ranges from that supported by the available literature, 23.1% of gross HF readmissions being potentially impacted by the interventions of healthcare (van Walraven & Forster, 2013), through up to 80% of HF readmissions being obviated by the activities of the healthcare team (Baptiste, Mark, Groff-Paris, & Taylor, 2014). The disparity in the available literature can contribute to an overestimation, or underestimation, of the potential results of any derivative intervention.

Raw facility HF readmission data obtained for this project were later found to lack some specificities, including a clear delineation between patient charges and facility costs. The graduate student was unable to obtain additional and more specific facility data, thus this limitation may have affected the precision and accuracy of the results.

This Doctor of Nursing practice project required the use of current trends to

produce predictions of future healthcare trends. The development of the pro forma, a document central to this graduate project, required cautious use of historical trends to produce inferences about future projections in HF readmission rates and penalties. These data points, while they may provide elements of useful insight, may be prone to error in an environment as dynamic as modern healthcare and cannot be extended beyond the specific care site.

Computing the cost of HF readmissions for a healthcare facility is not a linear process. If a facility requires CMS reimbursement to provide care and the value of this reimbursement is affected by penalties for readmission excess, this is a numerical amount that can be computed; though forecasting it into the future proves difficult.

## DNP Essentials and FNP Role

The DNP essentials (2014) established objectives for practice and education with respect to the DNP degree and practice within the healthcare environment (Zaccagnini & White, 2014). This evidence-based project addresses the guidance and mandate of the eight core DNP essentials for practice. As a project investigating a modern American health crisis, using real-world data translated into evidence-based practice guidance, this project meets multiple mandates of the DNP essentials: (I) Scientific underpinnings for practice, (III) Clinical scholarship and analytical methods for evidence-based practice, (V) Healthcare policy for advocacy in health care (Zaccagnini & White, 2014).

## Conclusion

Heart failure is a disease expected to increase in incidence and prevalence in the years to come (Heidenreich et al., 2011). The burden of care for this acute and chronic disease and its predicated rise in incidence within the US is expected to increase from $24.7B in direct medical expenditures in 2010 to $77.7B by 2030 (Heidenreich et al., 2011). The changing and uncertain reimbursement policies of regulators and payers for treating HF are strong motivators for facilities to capitalize upon methods that may yield enhanced patient care, patient outcomes, and reduce avoidable readmissions for HF following an initial hospital admission.

The reality that healthcare facilities, already struggling under the weight of financial penalties, may be distanced even further from an ability to correct those problems by the performance penalties, is itself problematic. If the most reliable solution to a $395k problem costs $67k per year, yet this number is placed out of reach by the penalties and fines of the reimbursement system, solutions would seem to be pushed farther and farther out of reach. While this is certainly an avenue to establish accountability, it can also create very real challenges for facilities that are already struggling.

This project could serve as a cogent argument for follow-up work with greater scope or available funding. This project demonstrates the potential impact of nursing care on improving the quality of life for HF patients, while substantially reducing the penalties and costs associated with avoidable HF readmissions. Education and communication are core skills and traits of the registered nurse. An expanded role within the spectrum of HF

care makes sense with respect to both patient health and the ongoing financial solvency of the United States healthcare system.

# REFERENCES CITED

Alehagen, U., Rahmqvist, M., Paulsson, T., & Levin, L. (2008). Quality-adjusted life year weights among elderly patients with heart failure. *European Journal of Heart Failure*, 10, 1033-1039. http://dx.doi.org/10.1016/j.ejheart.2008.07.015

American Association of Heart Failure Nurses. (2015). https://www.aanp.org/

American Heart Association. (n.d.). Arrhythmogenic right ventricular dysplasia. Retrieved September 15, 2017, from http://www.heart.org/HEARTORG/Conditions/More/Cardiomyopathy/Arrhythmogenic-Right-Ventricular-Dysplasia_UCM_444324_Article.jsp#.Wb1wZNOGNAY

Anker, S. D., Kohler, F., & Abraham, W. T. (2011). Telemedicine and remote management of patients with heart failure. *The Lancet*, 20;378(9792), 731-739, *http://dx.doi.org/*10.1016/S0140-6736(11)61229-4, 20;378(9792), 731-739

Baptiste, D. L., Mark, H., Groff-Paris, L., & Taylor, L. A. (2014). A nurse-guided patient-centered heart failure education program. *Journal of Nursing Education and Practice*, 4(3), 49-53. http://dx.doi.org/10.5430/jnep.v4n3p49

Boccuti, C., & Casillas, G. (2015). Aiming for fewer hospital U-turns: The Medicare Hospital Readmission Reduction Program. Retrieved from http://kff.org/medicare/issue-brief/aiming-for-fewer-hospital-u-turns-the-medicare-hospital-readmission-reduction-program/

Boyd, M., Turner, C., Thompson, D. R., & Stewart, S. (2011). Educational interventions for patients with heart failure: A systematic review of randomized controlled trials. *Journal of Cardiovascular Nursing*, *26*(4), E27-E35. http://dx.doi.org/10.1097/JCN.0b013e3181ee5fb2

Bradley, E. H., Curry, L., Horwitz, L. I., Sipsma, H., Wang, Y., Walsh, M. N., ... Krumholz, H. M. (2013). Hospital strategies associated with 30-day readmission rates for patients with heart failure. *Circulation: Cardiovascular Quality and Outcomes*, 6, 444-450. http://dx.doi.org/10.1161/CIRCOUTCOMES.111.000101

Bui, A. L., Horwich, T. B., & Fonarow, G. C. (2011). Epidemiology and risk profile of heart failure. *Nature Reviews Cardiology*, 8(1), 30-41. http://dx.doi.org/10.1038/nrcardio.2010.165

Burke, L. E., & Dunbar-Jacob, J. (1995). Adherence to medication, diet, and activity recommendations: From assessment to maintenance. *The Journal of Cardiovascular Nursing*, 9(2), 62-79.

Census and Economic Information Center (n.d.). How dense could we be? [PowerPoint slides]. Retrieved from http://ceic.mt.gov/Documents/Maps/Population/PopDensityComparison00.pdf

Centers for Disease Control and Prevention. (2012). Hospitalization for congestive heart failure: United States, 2000–2010. Retrieved from http://www.cdc.gov/nchs/data/databriefs/db108.htm

Centers for Disease Control and Prevention. (2014). Average length of stay (LOS) in days of hospital discharges with heart failure as first-listed diagnosis and diabetes as secondary diagnosis, United States, 1988–2006. Retrieved October 20, 2016, from http://www.cdc.gov/diabetes/statistics/cvdhosp/hf/fig2.htm

Centers for Medicare & Medicaid Services. (n.d.). HCAHPS: Patients' perspectives of care survey. Retrieved from https://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-instruments/HospitalQualityInits/HospitalHCAHPS.html

Centers for Medicare & Medicaid Services. (n.d.). Hospital Value-Based Purchasing. Retrieved May 25, 2016, from https://www.cms.gov/Medicare/Quality-initiatives-patient-assessment-instruments/hospital-value-based-purchasing/index.html

Centers for Medicare & Medicaid Services. (2011). Open door forum: Hospital Value-Based Purchasing fiscal year 2013 overview for beneficiaries, providers, and stakeholders. Retrieved from https://www.cms.gov/Medicare/Quality-initiatives-patient-assessment-instruments/hospital-value-based-purchasing/index.html

Centers for Medicare and Medicaid Services. (2016). Compare Hospitals. Retrieved August 30, 2016, from https://www.medicare.gov/hospitalcompare/compare.html#vwgrph=1&cmprTab=4&cmprID=270049%2C270004&cmprDist=1.4%2C0.9&dist=100&loc=BILLINGS%2C%20MT&lat=45.7832856&lng=-108.5006904

Centers for Medicare and Medicaid Services. (2016). FY 2016 IPPS Final Rule: Hospital Readmissions Reduction Program-Supplemental Data. Retrieved from https://www.cms.gov/Medicare/Medicare-Fee-for-Service-Payment/AcuteInpatientPPS/Downloads/FY2016-CMS-1632-FR-Readmissions.zip

Clark, R. A., Inglis, S. C., McAlister, F. A., Cleland, J. G., & Stewart, S. (2007, May 3). Telemonitoring or structured telephone support programmes for patients with chronic heart failure: Systematic review and meta-analysis. *British Medical Journal, 334*. http://dx.doi.org/http://dx.doi.org/10.1136/bmj.39156.536968.55

Congestive heart failure coordinator competency based job description. (n.d.). Retrieved from file:///Users/russellherring/Downloads/CONGESTIVE%20HEART%20FAILURE%20COORDINATOR,%20CARE%20MANAGEMENT.pdf

Corbin, J. M., & Strauss, A. (1991). A nursing model for chronic illness management based upon the Trajectory Framework. *Scholarly Inquiry for Nursing Practice: An International Journal*, 5(3), 155-174.

Dennison, C. D., McEntee, M. L., Samuel, L., Johnson, B. L., Rotman, S., Kielty, A., & Russell, S. D. (2011). Adequate health literacy is associated with higher heart failure knowledge and self-care confidence in hospitalized patients. *Journal of Cardiovascular Nursing*, *26*(5), 359-367. http://dx.doi.org/10.1097/JCN.0b013e3181f16f88

Desai, A. S., & Stevenson, L. W. (2012). Rehospitalization for heart failure: Predict or prevent? *Circulation*, *126*, 501-506. http://dx.doi.org/10.1161/CIRCULATIONAHA.112.125435

Feltner, C., Jones, C. D., Cene, C. W., Zheng, Z., Sueta, C. A., Coker-Schwimmer, E. J., ... Jonas, D. E. (2014, May 27). Transitional care interventions to prevent readmissions for persons with heart failure. *Annals of Internal Medicine*, *160*, 774-784. Retrieved from http://eds.a.ebscohost.com.proxybz.lib.montana.edu/ehost/pdfviewer/pdfviewer?sid=dfbd6808-57b0-41d9-b5cf-09f4befe7791%40sessionmgr4004&vid=1&hid=4110

Hajduk, A. M., Lemon, S. C., McManus, D. D., Lessard, D. M., Gurwitz, J. H., Spencer, F. A., ... Saczynski, J. S. (2013). Cognitive impairment and self-care in heart failure. *Journal of Clinical Epidemiology*, *5*, 407-416. http://dx.doi.org/10.2147/CLEP.S44560

HCAHPS Survery. (2016). Retrieved from http://www.hcahpsonline.org/files/March%202016_Survey%20Instruments_English_Mail.pdf

Heart failure fact sheet. (2013). "CDC Facts". Retrieved April 15, 2015, from http://www.cdc.gov/dhdsp/data_statistics/fact_sheets/fs_heart_failure.htm

Heart Failure Society of America. (2010). Executive summary: HFSA 2010 comprehensive heart failure practice guideline. *Journal of Cardiac Failure*, 16(6), 475-539. http://dx.doi.org/10.1016/j.cardfail.2010.04.005

Heidenreich, P. A., Trogdon, J. G., Khavjou, O. A., Butler, J., Dracup, K., Ezekowitz, M. D., ... Orenstein, D. (2011). Forecasting the future of cardiovascular disease in the United States: A policy statement From the American Heart Association. *Circulation*, 123, 933-944. http://dx.doi.org/10.1161/CIR.0b013e31820a55f5

Hersh, A. M., Masoudi, F. A., & Allen, L. A. (2013). Post-discharge environment following heart failure hospitalization: Expanding the view of hospital readmission. *Journal of the American Heart Association*, 2, 1-15. http://dx.doi.org/10.1161/JAHA.113.000116

Inglis, S. C., Clark, R. A., McCalister, F. A., Ball, J., Lewinter, C., Cullington, D., ... Cleland, J. G. (2010). Structured telephone support or telemonitoring programmes for patients with chronic heart failure. *Cochrane Database of Systematic Reviews*, 2010 Aug 4;(8):CD007228. http://dx.doi.org/10.1002/14651858.CD007228.pub2

Kane, R. L. (2006). *Understanding Health Care Outcomes Research* (2nd ed.). Sudbury, MA: Jone and Bartlett Publishers, Inc.

Kent, B., Cull, E., & Phillips, N. M. (2011). A systematic review of the effectiveness of current interventions to assist adults with heart failure to comply with therapy and enhance self-care behaviours. *JBI Library of Systematic Reviews*, 9(59), 2572-2626. Retrieved from http://www.joannabriggslibrary.org/index.php/jbisrir/article/view/81

Lee, J., & Park, S. (2010). The effectiveness of telephone-based post-discharge nursing care in decreasing readmission rate in patients with heart failure; a systematic review. *JBI Library of Systematic Reviews*, *8*(32), 1288-1303. Retrieved from https://www.ncbi.nlm.nih.gov/pubmed/27820201

Marieb, E. N., & Hoehn, K. (2012). *Human anatomy & physiology* (8th ed.). Boston, MA: Pearson.

McCance, K., & Huether, S. (2014). *Pathophysiology: The Biologic Basis for Disease in Adults and Children* (7th ed.). St. Louis, Missouri: Elsevier-Mosby.

Medicare.gov. (n.d.). Hospital readmission reduction program. Retrieved from https://www.medicare.gov/hospitalcompare/readmission-reduction-program.html

Occupational outlook handbook: Registered nurses. (n.d.). Retrieved November 27, 2016, from https://www.bls.gov/ooh/healthcare/registered-nurses.htm

Paul, S., & Kirkwood, P. (Eds.). (2015). *Heart failure nursing certification: Core curriculum review* (2nd ed.). Mt. Laurel, NJ: American Association of Heart Failure Nurses.

Percival, M., & Cottrell, W. M. (2012). Exploring the beliefs of heart failure patients towards their heart failure medicines and self-care activities. *International Journal of Clinical Pharmacology*, 34, 618-625. http://dx.doi.org/10.1007/s11096-012-9655-x

Qasim, M., & Andrews, R. (2012). Statistical brief #142. Retrieved from https://www.hcup-us.ahrq.gov/reports/statbriefs/sb142.pdf

Readmission reduction program. (n.d.). Retrieved from http://www.cms.gov/Medicare/medicare-fee-for-service-payment/acuteinpatientPPS/readmissions-reduction-program.html

Rice, S. (2015). Most hospitals face 30-day readmissions penalty in fiscal 2016. Retrieved from http://www.modernhealthcare.com/article/20150803/NEWS/150809981

Riegel, B., & Carlson, B. (2002). Facilitators and barriers to heart failure self-care. *Patient Education and Counseling*, 46, 287-295. http://dx.doi.org/10.1016/S0738-3991(01)00165-3

Rizzo, E. (2013). 6 Stats on the cost of readmission for CMS-tracked conditions. Retrieved from http://www.beckershospitalreview.com/quality/6-stats-on-the-cost-of-readmission-for-cms-tracked-conditions.html

Smith, D. H., Johnson, E. S., Blough, D. K., Thorp, M. L., Yang, X., Petrik, A. F., Crispell, K. A. (2012). Predicting costs of care in heart failure patients. *BMC Health Services Research*. 12(434), 1-9. Retrieved from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3527310/pdf/1472-6963-12-434.pdf

Smith, L. M., & Hobbs, R. (2015). Chapter 4: Pharmacologic treatment of heart failure. In S. Paul & P. Kirkwood (Eds.), *Heart failure nursing certification: Core curriculum review* (2nd ed., pp. 83-114). Mt. Laurel, NJ: American Association of Heart Failure Nurses.

Spring 2015 HCAHPS executive insight letter. (2015). Retrieved from http://www.hcahpsonline.org/executive_insight/

St. Vincent Healthcare Facts. (n.d.). Retrieved August 30, 2016, from http://www.svh-mt.org/about-us/st,-d-,-vincent-healthcare-facts/

Talwani, S. (2015). Five Montana hospitals penalized for readmission rates. Retrieved from http://www.kxlh.com/story/30135895/five-montana-hospitals-penalized-for-readmission-rates

The Chambersburg Hospital: Competency based job description. (n.d.). Retrieved from https://www.summithealth.org/HRJobsSHOrg/downloadjobdescription.htm;jsessionid=EC5B235AEABBB5A5BF4F3963E4539029?positioncode=3016203211

The Joint Commission. (2015). Advanced certification heart failure: Performance measurement implementation guide. Retrieved from http://www.jointcommission.org/assets/1/6/ACHFManual2015Oct.pdf

Titler, M. G., Jensen, G. A., Dochterman, J. M., Jie, X. J., Kanak, M., Reed, D., Shever, L. L. (2008). Cost of hospital care for older adults with heart failure: Medical, pharmaceutical, and nursing costs. *Health Services Research*, 43(2), 635-654. http://dx.doi: 10.1111/j.1475-6773.2007.00789.x

van Walraven, C., Forster, A. J. (2013). When projecting required effectiveness of interventions for hospital readmission reduction, the percentage that is potentially avoidable must be considered. *Journal of Clinical Epidemiology*, 66, 688-690. http://dx.doi.org/10.1016/j.jclinepi.2012.08.005

Wouters, O. J., Naci, H., & Samani, N. J. (2015). QALYs in cost-effectiveness analysis: An overview for cardiologists. *Heart*, 101, 1868-1873. http://dx.doi.org/10.1136/heartjnl-2015-308255

Xu, J., Murphy, S. L., Kochanek, K. D., & Arias, E. (2016). Mortality in the United States, 2015. Retrieved from https://www.cdc.gov/nchs/data/databriefs/db267.pdf

Yancy, C. W., Jessup, M., Bozkurt, B., Butler, J., Casey, D. E., Drazner, M. H., ... Januzzi, J. L. (2013). 2013 ACCF/AHA guideline for the management of heart failure: A report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines. *Circulation*, 128, e240-e327. http://dx.doi.org/10.1161/CIR.0b013e31829e8776

Zaccagnini, M. E., White, K.W. (2014). *The doctor of nursing practice essentials: A new model for advanced practice nursing* (2nd ed., pp. 303-354). Burlington, MA: Jones & Bartlett Learning.

# APPENDICES

# APPENDIX A

## MONTANA STATE UNIVERSITY INSTITUTIONAL REVIEW BOARD EXEMPTION FORM

MONTANA STATE UNIVERSITY

# INSTITUTIONAL REVIEW BOARD

**For the Protection of Human Subjects**
**FWA 00000165**

960 Technology Blvd. Room 127
c/o Microbiology & Immunology
Montana State University
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**MEMORANDUM**

**TO:** Russell Herring and Stacy Stellflug

**FROM:** Mark Quinn Mark Quinn CJ

**DATE:** November 9, 2016

**SUBJECT:** "*Cost-Effective Strategies to Minimize Heart Failure Readmission Rates [RH110916-EX]*

The above research, described in your submission of November 7, 2016, is exempt from the requirement of review by the Institutional Review Board in accordance with the Code of Federal regulations, Part 46, section 101. The specific paragraph which applies to your research is:

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

____ (b) (2) Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures or observation of public behavior, unless: (i) information obtained is recorded in such a manner that human subjects can be identified, directly or through identifiers linked to the subjects; and (ii) any disclosure of the human subjects' responses outside the research could reasonably place the subjects at risk of criminal or civil liability, or be damaging to the subjects' financial standing, employability, or reputation.

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

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

____ (b) (5) Research and demonstration projects, which are conducted by or subject to the approval of department or agency heads, and which are designed to study, evaluate, or otherwise examine: (i) public benefit or service programs; (ii) procedures for obtaining benefits or services under those programs; (iii) possible changes in or alternatives to those programs or procedures; or (iv) possible changes in methods or levels of payment for benefits or services under those programs.

____ (b) (6) Taste and food quality evaluation and consumer acceptance studies, (i) if wholesome foods without additives are consumed, or (ii) if a food is consumed that contains a food ingredient at or below the level and for a use found to be safe, or agricultural chemical or environmental contaminant at or below the level found to be safe, by the FDA, or approved by the EPA, or the Food Safety and Inspection Service of the USDA.

Although review by the Institutional Review Board is not required for the above research, the Committee will be glad to review it. If you wish a review and committee approval, please submit 3 copies of the usual application form and it will be processed by expedited review.

# APPENDIX B

## INSTITUTIONAL REVIEW BOARD OF BILLINGS EXEMPTION FORM

INSTITUTIONAL REVIEW BOARD OF BILLINGS

SERVING
Billings Clinic  Montana Cancer Consortium  St. Vincent Healthcare  Other Independent Investigators & Institutions

February 20, 2017

Russell Herring
1949 Hewitt Dr
Billings MT 59102

Dear Mr. Herring,

**DETERMINATION OF EXEMPTION FROM IRB REVIEW FOR APPROVAL**

This letter is issued following consultation on IRB exemption for the following process improvement project:

MONTANA STATE UNIVERSITY (MSU) / COLLEGE OF NURSING
ST. VINCENT HEALTHCARE
Russell Herring

**16.53** Cost-Effective Strategies to Minimize Heart Failure Readmission Rates

*Review included but was not limited to the following:* MSU IRB Designation of Research as Exempt from the Requirement of Institutional Review Board Review, dated 11/09/2016.

The IRB of Billings determined that the above-named and numbered project does not meet criteria for human subjects research, per 45 CFR, Part 46.101(b)(4). This doctorate of nursing practice process improvement project uses only published literature and deidentified patient information.

Provide any required IRB of Billings notification to participating sites, oversight authorities, sponsors, or others. Activities exempted by the IRB of Billings may be subject to further institutional review.

Sincerely,

Stephanie Fofonoff MHA BS
*Certified IRB Professional*



Tel (406) 238-5657 ~ Fax (406) 238-5669
1020 North 27th Street, Suite 120 Billings MT 59101-0760

# APPENDIX C

## PROCESS IMPROVEMENT PRESENTATION

# COST-EFFECTIVE STRATEGIES TO REDUCE HEART FAILURE READMISSION RATES

A PROCESS IMPROVEMENT PROJECT IN PARTIAL FULFILLMENT OF THE DOCTOR OF NURSING PRACTICE
MONTANA STATE UNIVERSITY

RUSSELL R. HERRING, BS, BSN, MAS, RN, PCCN, CHFN, CVRN-BC, CSCS

## OVERVIEW

- Background of the story
- Heart Failure
- The Hospital Readmission Reduction Program
- Methods to reduce readmission rates and benefits
- Project Goals
- Findings
- Proposal

## BACKGROUND

- A personal desire to remain near the cardiovascular patient population
  - Personal experience with cardiac patients
  - 2015 news report by Talwani of CMS-penalized Montana hospitals
- Conversation with BJ Gilmore
  - Business plan for HF clinic?
  - Stacy Stellflug, Ph.D. helped carve this into a more manageable size

## HEART FAILURE

- Leading cause of hospitalization in those >65 years of age (Desai & Stevenson, 2012)
- $24.7B in direct medical expenditures 2010
  - Projected to grow to $77.7B by 2030 (Heidenreich, et al., 2011)
- Fueled by by population-level societal trends such as obesity, Type II diabetes and myocardial infarction.
  - Interestingly, additionally fueled my the advanced abilities of medicine to more commonly redefine the above as survivable occurrences
- Historical 30-day readmission rates of 25% (Feltner, et al., 2014)
- Home management extremely complicated

## THE HOSPITAL READMISSION REDUCTION PROGRAM

- Established by the Affordable Care Act as an amendment to the Social Security Act
  - Provided the legal mandate that certain medical conditions, heart failure among them, have modifiable risks that can be addressed and elicit a diminished readmission rate
  - Centers for Medicare and Medicaid Services reimbursements are then calculated based on a formula which defines acceptable readmission rates, and admissions above the accepted rate contribute to a decrease in CMS-funded reimbursement
- The Talwani piece mentioned that St. Vincent Healthcare, in Billings, while not incurring the largest percent reduction in repayment, existed at the intersection of reduction and volume, receiving a 0.88% reduction, which equated to $395k, the largest in Montana, for the years 2011-2014

## METHODS TO REDUCE READMISSION RATES AND BENEFITS

- Many facilities have heart failure clinics
  - This was BJ Gilmore's original request but the project would have been enormous
- Remote monitoring has been used
  - This can look like many things, implantable devices, phone calls, specialized home devices
  - Generally in conjunction with a heart failure clinic
- Anything along a spectrum of education and monitoring
- Specialized heart failure nurses
  - This is bite-sized and a decent springboard for the development of a larger program
  - Follow-up phone calls found to reduce readmission rates by as much as 80% in one study (Baptiste, Mark, Groff-Paris, & Taylor, 2014).
  - Able to interpret signs and symptoms, triage and adjust therapies within protocol order sets

## PROJECT GOALS

- This work will seek to support the argument that a certified HF nurse employed to provide enhanced patient education and post-discharge follow-up care can beneficially affect the financial bottom line of the facility and disperse an improvement to patient quality-adjusted life years.

## PROPOSAL

- Addition of a certified heart failure nurse within the actual cardiac service line
  - First step toward creation of the heart failure clinic outright
  - Would be positioned within the leadership hierarchy below responsible midlevel providers
    - MD cardiologist provider remains within direct spectrum of care, when necessary
  - Many of the other tools are in place
    - MD cardiology staff
    - Non-physician provider cardiology staff
    - Techs
    - Various support structure within St. Vincent Healthcare

## PROPOSAL (CONTINUED)

- Heart failure nurse would serve as in-service continuity between in-patient and out-patient care
  - In-patient services would include dedicated HF education, developed by cardiology and provided, comprehensively, by a dedicated professional each and every time
    - Reduce inter-educator error
    - Ensure education is taught as intended for each patient
  - Out-patient services would initially include patient follow-up care
    - 72-hour phone follow-up
    - Three week phone follow-up

## CONCLUSION

- Background of the story
- Heart Failure
- The Hospital Readmission Reduction Program
- Methods to reduce readmission rates and benefits
- Project Goals
- Findings
- Proposal
- Questions?

# REFERENCES


- Baptiste, D. L., Mark, H., Groff-Paris, L., & Taylor, L. A. (2014). A nurse-guided patient-centered heart failure education program. *Journal of Nursing Education and Practice*,, 4(3), 49-53. http://dx.doi.org/10.5430/jnep.v4n3p49
- Centers for Medicare and Medicaid Services. (2016). FY 2016 IPPS Final Rule: Hospital Readmissions Reduction Program-Supplemental Data. Retrieved from https://www.cms.gov/Medicare/Medicare-Fee-for-Service-Payment/AcuteInpatientPPS/Downloads/FY2016-CMS-1632-FR-Readmissions.zip
- Desai, A. S., & Stevenson, L. W. (2012). Rehospitalization for heart failure: Predict or prevent? *Circulation*, *126*, 501-506. http://dx.doi.org/10.1161/CIRCULATIONAHA.112.125435
- Feltner, C., Jones, C. D., Cene, C. W., Zheng, Z., Sueta, C. A., Coker-Schwimmer, E. J., ... Jonas, D. E. (2014, May 27). Transitional Care Interventions to Prevent Readmissions for PersonsWith Heart Failure. *Annals of Internal Medicine*, *160*, 774-784. Retrieved from http://eds.a.ebscohost.com.proxybz.lib.montana.edu/ehost/pdfviewer/pdfviewer?sid=dfbd6808-57b0-41d9-b5cf-09f4befe7791%40sessionmgr4004&vid=1&hid=4110
- Heidenreich, P. A., Trogdon, J. G., Khavjou, O. A., Butler, J., Dracup, K., Ezekowitz, M. D., ... Orenstein, D. (2011). Forecasting the future of cardiovascular disease in the United States: A policy statement From the American Heart Association. Circulation, 123, 933-944. http://dx.doi.org/10.1161/CIR.0b013e31820a55f5
- Talwani, S. (2015). Five Montana hospitals penalized for readmission rates. Retrieved from http://www.kxlh.com/story/30135895/five-montana-hospitals-penalized-for-readmission-rates

# APPENDIX D

## HEART FAILURE NURSE JOB DESCRIPTION

**St. Vincent Healthcare**

Position Description and Job Requirements

| | |
|---|---|
| **Position Title:** Congestive Heart Failure Navigator | **Department:** Cardiology |
| **Department Approval:** | **HR Approval:** |

**Position Function:** The Congestive Heart Failure Navigator serves as practitioner, educator, consultant and collaborator to provide advanced clinical and analytical skills in the care/management of the heart failure patient population. Assists in policy and procedure development and implementation. Conducts nursing research and performance improvement initiatives as assigned. Examines daily hospital inpatient census for applicable DRG/admitting complaints and provides standardized and individualized heart failure education to these inpatients. Conducts appropriate follow up interventions following discharge from acute-care services.

**Qualifications and Standards**

**Education:** Graduate of an accredited school of nursing. BSN required. MSN preferred.

**Experience:** Minimum 2 years' recent clinical experience directly related to cardiology. Experience in performance improvement principles and education preferred. Experience with vasodilatory, chronotropic, inotropic, beta blockers and other medications routinely used in the standard care of heart failure patients required. Experience with implantable cardiac pacemakers/defibrillators required. Computer proficiency including Word, Excel and PowerPoint preferred.

**Certifications/Licensure:** Current active and unrestricted licensure as a registered nurse in the state of Montana. Current BLS, ACLS required. The successful candidate will hold current certification as a CCRN or PCCN. Acquisition of CHFN within one year of hire mandatory.

**General Requirements**

The following requirements are expected of all employees:

**Core Values:** Service of the poor, Reverence, Integrity, Wisdom, Creativity and Dedication.

**Evidence-Based Practice:** Provides care in accordance with evidence-based guidelines

**Safety Awareness:** Hospital fire, safety and disaster procedures.

**Confidentiality:** Maintains employee and patient confidentiality in accordance with HIPAA requirements.

**Attendance:** Regular attendance is an essential requirement of the position.

**Leadership Standards:**

**Character:** Attitude, Integrity and Role Modeling

**Job Performance:** Results orientation, Customer Focus, Decision Making, Awareness

**Interpersonal Skills:** Effective written and verbal communication, Relationship-building, Team Player, Celebration

**Innovation:** Breakthrough thinking, Knowledge building/sharing, Coaching/Empowering, System Vision and Management

**Physical and Mental Requirement:** Classified as medium work by the Dictionary of Occupational Titles: May be required to lift 20-50 pounds occasionally and/or 10-20 pounds frequently. Work duties may require up to several hours standing and walking as part of daily work activities.

- Bends, twists and squats occasionally.
- Lifts to 50 pounds laterally and from waist level.
- Pulls/pushes up to 125 pounds.
- Carries up to 15 pounds.
- Ability to move rapidly in response to unpredictable emergencies and patient behaviors.
- Reaches occasionally up tot 2 feet overhead/in front of torso.
- Manual dexterity necessary to use computer keyboard and other electronics.
- Near-visual acuity for reading small-print medication labels and performing other near-field tasks.
- Auditory acuity adequate for hearing telephone conversations and speaking with patients and staff.
- Ability to speak and write using the English language.

Mental Requirements: Position may involve time-constrained, stressful work and the candidate should possess sound poise and ability to work under pressure, and must possess the ability to communicate effectively while under stress. Must be able to prioritize tasks and coordinate with others.

**Working Environment:** Work is primarily in a well-lit, well-ventilated, clinical or office environment with the hospital and adjoining clinical areas. Possible exposure to persons with infectious disease, bodily waste or bodily fluids.

**Reporting Structure:** Reports to the Director of Cardiology Services

**Disclaimer:** These essential job functions are requirements of the position which must be performed either with or without reasonable accommodation. The essential job function list is intended to be a guide, rather than a limitation. St. Vincent Healthcare retains the right to add new responsibilities to the list as business demands dictate. Some of the essential job functions may exclude individuals who pose a direct threat/significant risk to the health and safety of themselves or others.

By identifying essential job functions, we are in no way stating or implying that these required tasks are the only activities that are to be performed by the employee occupying the position. In addition, employees will also be expected to follow any other job-related instructions and to perform any other job-related duties that are included in the job description. The preceding requirements represent only the minimum acceptable levels of knowledge, skills and/or abilities that a job incumbent must possess. In order to perform the job successfully, the incumbent will possess additional aptitudes so as to perform the other duties that the job description entails.

**Essential Functions and Responsibilities**

**Core Values:**

Service of the Poor - Generosity of spirit, especially for persons most in need

This core value affirms that we demonstrate a special commitment to serving those who are physically, emotionally, spiritually and financially poor and vulnerable. We bring this to life by giving of ourselves generously and without hesitation. The following examples show how we exemplify this daily:

- Reach out to those in need without hesitation or judgment.
- Advocate for those whose voices need lifting.
- Put the needs of others before our own.
- Empower others to help themselves.
- Build relationships and collaborations for a common good.

Reverence - Respect and compassion for the dignity and diversity of life

This core value affirms that each person has special value, unique talents and varied gifts. When we revere life, we act with deep respect and compassion for the dignity and diversity of life. The following behaviors and attitudes show how we attempt to do just that daily:

- Invite and appreciate the uniqueness of people and their viewpoints
- Be empathic by listening, reflecting and accepting people and where they are in life
- Conscientiously care for our environment
- Be with those most vulnerable and recognize that not only patients, but also families, co-workers and physicians need help from time to time
- Heal the physical, spiritual and emotional needs of others

Integrity - Inspiring trust through personal leadership

This core value suggests that our words and actions should be consistent with our values. In day-to-day terms, living with integrity may be recognized as how we:

- Hold ourselves personally accountable to do what is right and ethical.
- Maintain high standards of excellence and performance.
- Communicate with honesty, compassion, directness and respect.
- Collaborate with patients, families, co-workers and others as appropriate in a mission- and values-based way.
- Help others to think through and act ethically.
- Consider how to display and encourage important characteristics, such as courage, strength, honesty and trust.

# APPENDIX E

## DESCRIPTION OF NURSE NAVIGATOR NECESSARY DAILY TASKS AND ACTIVITIES

Necessary Daily Activities and Schedule

| | |
|---|---|
| 0800 | Arrive at work |
| 0800-0830 | Examine overnight hospital admissions for patients who will require HF education |
| 0830-1700 | 3-day follow-up phone calls for discharged patients |
| 0830-1700 | 20-day follow-up phone calls for discharged patients |
| 0830-1700 | Conduct inpatient education with newly-admitted HF patients, with a concerted effort being made to see patients discharging that same day early in the day, so as to not delay discharge |
| 1700 | End work day |

The daily schedule is not necessarily carved in stone, with respect to what happens when, so long as inpatient education transpires and post-discharge calls do as well.