

THE USE OF INTEGRATED FLOWSHEETS IN THE ELECTRONIC
MEDICAL RECORD IN MANAGEMENT OF HEART FAILURE:
A QUALITY IMPROVEMENT PROJECT

by

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GLOSSARY or NOMENCLATURE

1. ACC: American College of Cardiology
2. ACEi: angiotensin-converting enzyme inhibitor
3. AHA: American Heart Association
4. ARB: angiotensin receptor blocker
5. ARNi: angiotensin receptor-neprilysin inhibitor
6. BB: beta blockers
7. EMR: electronic medical record
8. GDMT: guideline-directed medical therapy
9. HFrEF: heart failure with reduced ejection fraction
10. LVEF: left ventricular ejection fraction
11. MRAs: mineralocorticoid receptor agonists
12. NYHA: New York Heart Association
13. SGLT2i: sodium-glucose cotransporter-2 inhibitors

ABSTRACT

Background: Heart failure affects a large number of the population globally with expected increases in the coming years. Rural populations are at higher risk of developing heart failure with higher mortality and hospitalization rates as compared to urban populations, often related to social determinants of health. Interventions to improve adherence to medical therapy and increase efficiency are imperative to ensure individual providers are providing quality care to heart failure patients.

Methods: A heart failure flowsheet was implemented in a private cardiology practice in North Central Montana. The flowsheet included aspects of heart failure management such as New York Heart Association class, medications, and standard cardiac evaluations with the hopes that the flowsheet would improve efficiency and adherence to GDMT.

Results: Seventy-seven patients with heart failure or cardiomyopathy were evaluated during the implementation period. Of those, 88% had a flowsheet encounter created. Of those seen, 36% were on all four classes of medications. Six had additional medications added to their heart failure regimen. Important insights were noted regarding medication utilization, with 41% of those on less than four classes of medications having explicit reasons as to why. Providers and clinic staff recognized a subjective improvement in efficiency with flowsheet utilization.

Conclusion: Implementation of the heart failure flowsheet provided invaluable information to the clinic and providers regarding heart failure management and improved efficiency. The results of the QI project will continue to guide the clinic in heart failure management and allow for further assessment of medication utilization and patient outcomes.

CHAPTER ONE

REVIEW OF THE LITERATURE

Introduction

Heart failure affects 64 million people globally, with a projected increase of 46% in the United States by the year 2030 (Shahim et al., 2023). The American Heart Association (AHA) and American College of Cardiology (ACC) define heart failure as symptoms due to structural changes in the heart resulting in impairment of left ventricular filling and ejection of blood (Heidenreich et al., 2022). Heart failure is classified by left ventricular ejection fraction, of which there are three classes: heart failure with reduced ejection fraction (EF) ($EF < 40\%$), heart failure with mildly reduced ejection fraction ($EF: 41-49\%$), and heart failure with preserved ejection fraction ($EF > 50\%$) (Heidenreich et al., 2022). Risk factors for heart failure include hypertension, obesity, prediabetes, diabetes, and atherosclerotic heart disease. Common causes of heart failure include ischemic heart disease/myocardial infarction, hypertension, and valve disease. Other causes include genetic cardiomyopathies, cardiotoxic medications, cardiotoxic substances such as recreational drugs and alcohol, tachycardia, chronic right ventricular pacing, and stress-induced cardiomyopathies (Heidenreich et al., 2022).

Background

Current data demonstrates a 2.5% prevalence of heart failure in the United States, of which 76% have heart failure with reduced ejection fraction (Shahim et al., 2023). In the US, there are approximately 915,000 new cases of heart failure per year, with an incidence of 10 per 1,000 in individuals over 65 years of age and a lifetime risk of developing heart failure after age

40 of 20% (Savarese & Lund, 2017). Heart failure continues to be one of the top three causes of hospitalization, especially in geriatric populations (Shahim et al., 2023). Furthermore, individuals with heart failure have the highest incidence of 30-day readmission rates compared with other chronic diseases (Shahim et al., 2023). Of the varying types of heart failure, heart failure with reduced ejection fraction (HFrEF), also called systolic heart failure, demonstrates the highest one-year mortality at 37.5% as well as the highest one-year heart failure hospital readmission rate of 30.9% (Savarese & Lund, 2017). It is estimated that in 2018, total healthcare costs for patients with heart failure were \$179.5 billion, with total costs per individual at \$32,955; most expenditures are attributable to the cost of hospitalization (Bozkurt et al., 2023).

Guideline-directed medical therapy (GDMT) for the treatment of heart failure with reduced ejection fraction includes angiotensin-converting enzyme inhibitors (ACEi)/angiotensin receptor blockers (ARB)/angiotensin receptor-neprilysin inhibitor (ARNi), beta-blockers, mineralocorticoid receptor agonists (MRAs), and sodium-glucose cotransporter-2 inhibitors (SGLT2i) (Heidenreich et al., 2022). It is recommended that ARNi be used as the initial treatment for HFrEF due to the significant reduction in morbidity and mortality observed with this medication (Heidenreich et al., 2022). When all four medication classes are utilized to treat heart failure, there is a 73% reduction in all-cause mortality compared to no treatment (Heidenreich et al., 2022). Without the use of GDMT for the treatment of heart failure, the 2-year mortality rate is approximately 35% (Bozkurt et al., 2023). Use of GDMT remains suboptimal, with estimations that implementation of GDMT could prevent 100,000 deaths per year in the United States (Bozkurt et al., 2023). Additional treatment for HFrEF includes interventional procedures such as implantable cardioverter defibrillators, cardiac resynchronization therapy, and

coronary revascularization with percutaneous coronary intervention or coronary artery bypass grafting in patient populations where ischemia is thought to contribute to the reduction in ejection fraction (Heidenreich et al., 2022).

Data specific to Montana regarding the prevalence and incidence of heart failure is challenging to find, likely due to the low population. However, it has been found that rural populations, like that of Montana, have a 19% greater risk of developing heart failure than urban populations (Turecamo et al., 2023). Additionally, rural residents have higher rates of hospitalization and 30-day and 90-day mortality rates when compared to urban residents (Pichan & DeVore, 2024). Much of this is attributable to poorer overall health in rural areas with higher rates of diabetes, obesity, smoking, hypertension, and lack of physical activity (Pichan & DeVore, 2024). Challenges plaguing rural populations include lower education levels, income disparities, substance use, transportation issues, and availability of healthcare (Pichan & DeVore, 2024).

Lack of adherence to GDMT in the treatment of heart failure has significant implications on the morbidity, mortality, and quality of life of individuals with heart failure. Rural populations are at increased risk of developing heart failure due to a multitude of factors. This highlights the importance of understanding and adhering to current guidelines to improve health outcomes in Montanans with heart failure.

Methods

Overview

The scoping review examined the importance of GDMT and gaps in care for the treatment of systolic heart failure. It utilized the PRISMA framework for article inclusion. All

articles were independently assessed to determine relevance to the scoping review and importance to the overall discussion regarding the treatment of systolic heart failure.

Search Strategy

This scoping review utilized databases available at the Montana State University Library. A thorough and exhaustive search was completed utilizing the following databases: PubMed and Cumulative Index to Nursing and Allied Health Literature (CINAHL). A consultation with a Montana State University librarian was completed. Search terms for this scoping review included “systolic heart failure AND treatment”. In an attempt to include articles specific to practitioner interventions in the treatment of heart failure, the search term “flowsheet” was added with no results. However, articles assessing the use of flowsheets in other chronic diseases were obtained. While not included in the literature review, these will be included for reference in other sections. Reference lists of multiple articles were reviewed to assess for other relevant literature to the scoping review.

Inclusion Criteria

Initially, all articles published prior to 2014 were excluded from the search. However, after reviewing reference lists, this was extended to include articles published after 2000 to allow for the inclusion of studies evaluating the impact of beta-blocker therapy in the treatment of heart failure. Inclusion criteria included peer-reviewed, full-text articles published after 2000 and written in English. Exclusion criteria included studies evaluating pediatric populations, interventional procedures, arrhythmias, heart failure with preserved ejection fraction, hypertrophic cardiomyopathy, and intravenous therapies.

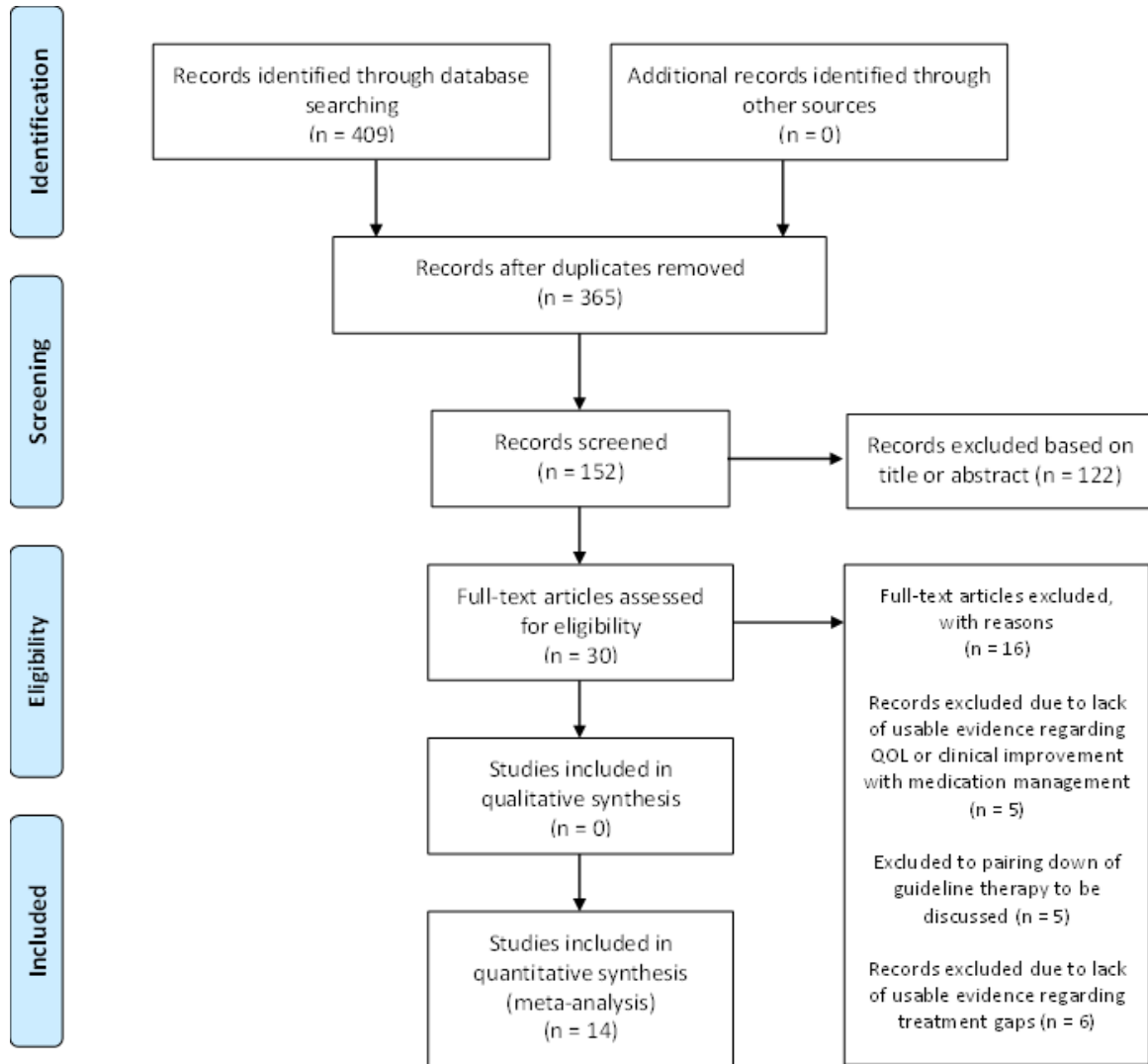


Figure 1.1 PRISMA Diagram

Results

Literature Search

A total of 152 articles were screened, with 122 being removed for title and abstract relevance, leaving 30 manuscripts for full review. Fourteen studies met the inclusion criteria for the scoping review.

Characteristics of the Literature

Utilization of the Melnyk critical appraisal tool for literature review, the search yielded fourteen full-text articles that met inclusion criteria for review: four randomized controlled trials, one meta-analysis, one systematic review, one guideline, and six retrospective cohort studies.

Synthesis of the Literature

AHA/ACC guidelines recommend using ACE/ARB/ARNi, beta-blockers, MRAs, and SGLT2i to treat heart failure with reduced ejection fraction. This scoping review focuses on the positive impacts of these medications on morbidity, mortality, hospitalization, and quality of life. Additionally, data regarding the treatment gaps in prescribing these medications was utilized to highlight the need for additional intervention to ensure adherence to guideline-directed medical therapy.

Treatment Gaps & Impacts A review of the literature extensively demonstrated that there is a significant treatment gap in the management of systolic heart failure. Prescribing rates of ACEi/ARBs, BBs, and MRAs were 69-84%, 46-76.7%, and 24.7-38% respectively (Chin et al., 2016; Grewal et al., 2021). Of patients prescribed GDMT with ACE/ARB, beta-blocker, and MRA, only 42-50% were prescribed greater than or equal to the target dose for the treatment of heart failure (Chin et al., 2016; Grewal et al., 2021). Patients who were elderly, female, or had renal failure were less likely to be prescribed ACE/ARB, and patients who were female or had chronic obstructive pulmonary disease or asthma were less likely to be prescribed beta-blockers (Chin et al., 2016). Patients optimized with $\geq 50\%$ of the target dose of GDMT were more likely to be young, weigh more, and have higher blood pressure (Grewal et al., 2021). However, when GDMT is initiated, it has been found that mortality decreased by 27%-45% and 30-day

readmission significantly decreased (Chin et al., 2016; Grewal et al., 2021; Nguyen et al., 2020). Additionally, medications used in the treatment of heart failure had a significant impact on healthcare costs in those with systolic heart failure, demonstrating lower all-cause costs (Nguyen et al., 2020). Further interventions are needed to ensure the appropriate use of guideline-directed medical therapy in the treatment of heart failure. Suggestions include utilizing electronic medical records to promote adherence to GDMT (Chin et al., 2016).

ACEi, ARB, ARNi ACEi and ARBs have been a cornerstone of the treatment of heart failure. More recently, Entresto (an ARNi) has also been added to the guidelines and is felt to be superior to traditional ACEi/ARB therapy (Heidenreich et al., 2022). Nevertheless, treatment with ACEi, ARB, or ARNi is recommended in treating HFrEF (Heidenreich et al., 2022). ACEi/ARB prescription has been associated with better survival, even at low doses (Sargento et al., 2016). However, higher doses of ACE/ARB improved survival compared to lower doses (Sargento et al., 2016). Patients taking Entresto demonstrated an overall lower mortality and hospitalization rate when compared to those taking standard heart failure treatment (ACE/ARB) (Chang et al., 2019; McMurray et al., 2014; Park et al., 2023). Furthermore, the use of Entresto demonstrated a significant increase in left ventricular ejection fraction (LVEF) and a significant decrease in New York Heart Association (NYHA) heart failure symptoms at both 3 and 12 months (Landolfo et al., 2020). Overall, using ACEi, ARB, or ARNI significantly improved mortality and hospitalization rates; however, Entresto demonstrated the most significant benefit.

SGLT2 Inhibitors SGLT inhibitors such as Jardiance and Farxiga are now a class 1A recommendation according to the AHA/ACC in the treatment of heart failure (Heidenreich et al., 2022). In patients taking Farxiga, there was a decrease in cardiovascular death and

hospitalizations. Additionally, there was a notable improvement in heart failure symptoms in patients taking Farxiga, with a significant increase in the Kansas City Cardiomyopathy Questionnaire (KCCQ) score (McMurray et al., 2019). The KCCQ measures quality of life in those with heart failure and is scored from 0 to 100, the higher the score, the better the patients' health status (McMurray et al., 2019). These benefits were most noted in individuals with NYHA class II heart failure symptoms; however, a benefit was still noted in patients with NYHA class III and IV heart failure symptoms (McMurray et al., 2019). In addition to decreased hospitalizations, death, and symptomatic improvement, Farxiga was demonstrated to have beneficial effects on ventricular remodeling. Farxiga showed a significant decrease in left ventricular end-diastolic volume, left ventricular end-systolic volume, and left ventricular mass index (Carluccio et al., 2023). Furthermore, there was a significant increase in left ventricular ejection fraction when compared with controls (Carluccio et al., 2023). Although newer in the treatment of heart failure, SGLT2i has had a significant impact on improving heart failure symptoms, ejection fraction, and ventricular remodeling, while also reducing mortality and hospitalizations from heart failure.

Beta Blockers Beta-blockers used in the treatment of heart failure include bisoprolol, metoprolol controlled/extended release, carvedilol, and nebivolol. Metoprolol, bisoprolol, and carvedilol all demonstrate similar efficacy, safety, and tolerability (Wikstrand et al., 2014). The use of beta-blockers in heart failure reduces the risk of death related to cardiovascular and noncardiovascular causes (Hjalmarson et al., 2000; Packer et al., 2002). Carvedilol demonstrated a 33% reduction in hospitalization related to heart failure, while Metoprolol demonstrated a 31% reduction (Hjalmarson et al., 2000; Packer et al., 2002). Both Metoprolol and Carvedilol reduced

the risk of death by 24% and 19%, respectively (Hjalmarson et al., 2000; Packer et al., 2002). Furthermore, patients expressed symptomatic improvement with Metoprolol and Carvedilol (Hjalmarson et al., 2000; Packer et al., 2002). Beta-blockers have been and continue to be a mainstay of therapy in the treatment of heart failure.

Conclusion

The evidence in this scoping review exemplifies the importance of guideline-directed medical therapy in the treatment of heart failure. Despite this, significant treatment gaps still exist. The prescribing rates of ACEi/ARBs, BBs, and MRAs are consistently low, with 69-84%, 46-76.7%, and 24.7%-38%, respectively (Chin et al., 2016; Grewal et al., 2021). These studies do not examine the prescribing rates of ARNi or SGLT2i; however, the cost of these medications remains a significant limiting factor in their use with Medicare patients having to pay upwards of \$300 to \$700 for a 30-day supply (GoodRx, 2024). The use of GDMT in the treatment of HFrEF has been shown to have significant impacts on morbidity, mortality, quality of life, and hospitalization (Heidenreich et al., 2022). The increased prevalence of heart failure in rural communities provides an impetus for improvement in heart failure management in Montana. Given this, additional interventions are needed to ensure and promote adherence to current recommendations in the treatment of heart failure.

The use of flowsheets in other chronic diseases, such as chronic obstructive pulmonary disease (COPD) and diabetes, has improved adherence to current guidelines and recommendations (Terasaki et al., 2015; Valencia & Dols, 2021). The use of flowsheets in an outpatient pulmonology clinic demonstrated improved screening and prescribing of guideline therapy (Terasaki et al., 2015). When flowsheets were used in a primary care clinic for diabetes

management, there was an overall decrease in A1C in patient populations utilizing the flowsheet (Valencia & Dols, 2021). Given this, using an integrated flowsheet in the electronic medical record may enhance adherence to guideline therapy in heart failure treatment, ultimately improving patient outcomes.

CHAPTER TWO

QUALITY IMPROVEMENT PROPOSAL

Introduction and ProblemIntroduction

Heart failure affects over 65 million people globally and 2.5% of Americans (Shahim et al., 2023). Symptoms of heart failure can significantly impact one's quality of life (i.e. improved exercise tolerance, shortness of breath, reduction of heart failure symptomatology). The use of guideline-directed medical therapy (GDMT) in the treatment of heart failure has demonstrated to have significant impacts on morbidity, mortality, and quality of life (Heidenreich et al., 2022). When all four medication classes are used in the treatment of heart failure with reduced ejection fraction (HFrEF), there is a 73% reduction in all-cause mortality (Heidenreich et al., 2022). In contrast, when GDMT is not used in the treatment of heart failure, there is a 35% two-year mortality rate (Bozkurt et al., 2023). Despite this, there is a significant gap in the treatment of heart failure and the prescribing of these medications (Chin et al., 2016; Grewal et al., 2021). This becomes especially important when discussing treatment in Montana as it has been found that individuals in rural areas are at higher risk of developing heart failure, have higher hospitalization rates, and have higher 30-day and 90-day mortality related to heart failure (Pichan & DeVore, 2024; Turecamo et al., 2023).

Problem Statement

A cardiology practice in North Central Montana cares for individuals with all spectrums of cardiovascular disorders, including those in interventional cardiology, electrophysiology, and

general cardiology. The wide breadth of care provided at this practice addresses a significant number of primary issues that could contribute to the development of heart failure. There is no national benchmark for the use of GDMT in heart failure, therefore, it is imperative that individual practitioners institute measures to assure quality care is provided to heart failure patients. Implementation of an integrated flowsheet (Appendix B) in the electronic medical record (EMR) will be utilized to increase adherence to GDMT, with the intent of leading to improved patient outcomes. Figure 2.1 demonstrates multiple contributing factors to the lack of adherence to GDMT in the treatment of heart failure at the clinical site.

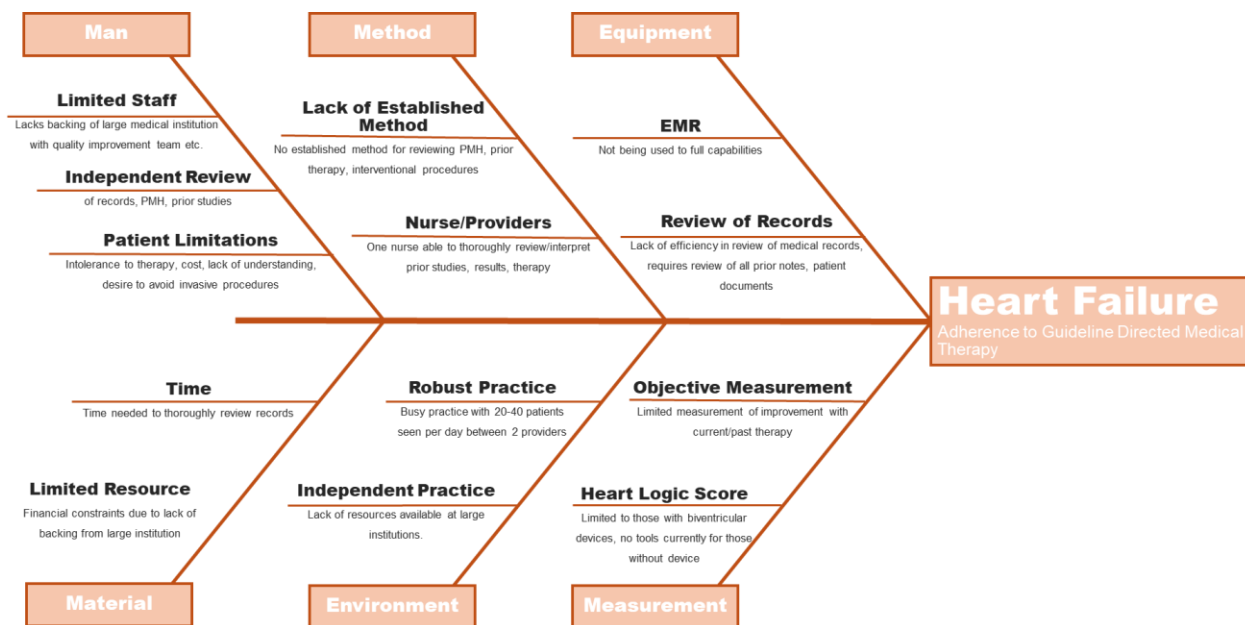


Figure 2.1 Fishbone Diagram

Context

Patients in North Central Montana established with a cardiology practice present with a wide range of cardiovascular issues. The practice is comprised of one cardiologist and one nurse

practitioner, both of which have worked in cardiology for over 20 years. The cardiologist performs procedures such as electrophysiology studies, heart catheterizations, and pacemaker/implantable cardioverter defibrillator placement. The practice provides services such as the procedures named above, echocardiography, peripheral vascular imaging, loop recorder insertion, and runs a robust pacemaker clinic. There are two nurses (RN), one certified medical assistant (CMA), and two certified nursing assistants (CNAs). Additionally, there are three front staff, one of which specifically schedules procedures at the local hospital for the physician.

Since October 1, 2022, the clinic has seen a total of 3,891 patients for provider appointments. Of these patients, 507 have a diagnosis of heart failure or cardiomyopathy listed in their problem list. This accounts for 13% of the patient population established with one of the two providers at the clinic. Currently, of the 507 patients with heart failure, 73% are prescribed angiotensin-converting enzyme inhibitors/angiotensin receptor blockers/angiotensin receptor-neprilysin inhibitors (ACEi/ARB/ARNi) by the clinic, 56% are prescribed a beta-blocker, 22% are prescribed a mineralocorticoid receptor agonist (MRA), and 12% are prescribed a sodium-glucose cotransporter-2 inhibitor (SGLT2i). While some patients may have contraindications or intolerance to these four medications, it is desired to have patients with HFrEF on all four medications for optimal results.

Quality Improvement Framework

The quality improvement framework that will be utilized in this project is the Plan-Do-Study-Act (PDSA) from the Institute of Healthcare Improvement (IHI). The PDSA format allows for adaptation of the intervention to ensure the desired change is noted (Improvement, n.d.).

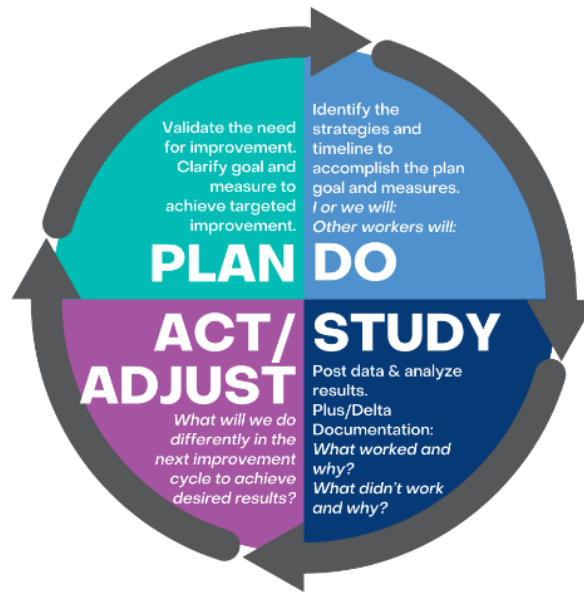


Figure 2.2 PDSA Cycle

Plan

The providers and clinical staff at this organization noted difficulties in ensuring patients are maintained on GDMT for the treatment of heart failure. These issues include time, staffing, robustness of practice with the two providers seeing a total of 120 patients per week, and thorough review of prior notes, to name a few. The staff is dedicated to providing evidence-based care and adhering to GDMT in the treatment of heart failure to ensure positive outcomes in their patient population. It was decided to formulate and implement an integrated flowsheet in the EMR to delineate certain aspects of care in patients with heart failure. Flowsheets have been

demonstrated to improve outcomes and adherence to guideline-directed medical therapy in other chronic diseases (Terasaki et al., 2015; Valencia & Dols, 2021). The flowsheet will outline aspects of heart failure management, including medical therapy that has been initiated or tried, contraindications or intolerances to medical therapy, New York Heart Association (NYHA) class, echocardiographic studies, ischemic evaluations, and additional interventional procedures that have been completed, including implantation of implantable cardioverter defibrillators or biventricular device implantations. Staff at the clinic will be educated on the components of the flowsheet (see Appendix C) to assure optimal use.

Do

The EMR will be queried for active patients seen between October 1, 2022, and October 22, 2024 with the ICD-10 codes 142.9, 125.5, 142.8, 150.20, I50.22, 150.42, or I50.22 (see Appendix C) in their problem list. Flowsheet categories will be created by this DNP student and implemented by clinical staff at the practice. A heart failure flowsheet will be created and completed for each patient seen within the 6-week implementation period with one of the above ICD-10 codes in their problem list. Flowsheet encounters will be updated with each change in the patient's status, medications, echocardiographic results, and interventional procedures. The flowsheets will be created for all new patients with a diagnosis of systolic heart failure/HFrEF and updated for each established patient throughout the duration of the quality improvement project. After conclusion of the project, the practice will continue utilizing the flowsheet to document important updates on patient status changes, medication utilization, and interventional procedures for concise and efficient documentation.

Study

Adherence to GDMT will be assessed prior to intervention implementation. Flowsheets will be instituted for every patient with one or multiple of the above diagnoses seen within the 6-week implementation period. Flowsheets will be initiated and updated throughout the course of the project. A new flowsheet encounter will be created for each patient with heart failure when therapeutic changes are made or updated results of cardiovascular studies obtained (i.e. echocardiograms, electrocardiograms, ischemic evaluations). The providers and clinical staff will continuously assess patients for maximization of medical therapy in the treatment of heart failure. At the conclusion of the project, use of the flowsheet will be assessed to determine if the practice change is being utilized by providers and clinical staff. Additionally, adherence rates will be reassessed to determine if the implementation of flowsheets improved adherence to GDMT in the treatment of heart failure.

Act

The utilization of flowsheets in patients with heart failure diagnosis will be assessed at the conclusion of the quality improvement project. The effectiveness of flowsheets in adherence and compliance to GDMT will be assessed. If there is low utilization of the flowsheet, barriers to use will be assessed during discussions with providers and clinical staff. Further assessment and analysis will be discussed in following sections. Additionally, if there is no increase in utilization of GDMT in the treatment of heart failure, reassessment with the clinic providers and staff will take place to determine barriers to use of GDMT. Recommendations for improvement in flowsheet categories or continued barriers to utilization of GDMT will be addressed. If it is felt

that there could be improvements to the flowsheet and implementation, additional PDSA cycles will be implemented.

Methods

Implementation Summary

The clinical site for the quality improvement project is a privately owned cardiology practice in North Central Montana. The clinical staff and providers noted a lack of efficiency in heart failure management with the current system. In the current state, review of multiple notes and documentation from other facilities is necessary to determine a patient's status regarding GDMT and interventional procedures related to heart failure management. Given this, an integrated flowsheet in the EMR will be developed to be completed for all patients with a heart failure diagnosis. This flowsheet will include information regarding current and past use of recommended medications in the treatment of heart failure, echocardiogram results, and interventional procedures completed. The flowsheet will be implemented and filled out for all patients with a heart failure diagnosis seen within a 6-week period. The individuals seen during this time frame will be assessed prior to flowsheet implementation and after. Assessment of adherence to GDMT will be reviewed to determine if flowsheet implementation increased adherence to GDMT, to include the four pillars of heart failure management: ACEi/ARB/ARNi, beta-blockers, MRAs, and SGLT2i.

Intervention and Implementation

This quality improvement project aims to improve adherence to GDMT in the treatment of heart failure with utilization of an integrated flowsheet in the EMR. The flowsheet allows for

efficient and readily available documentation of pertinent medical therapy and findings related to heart failure. The development of the flowsheet and its categories will be completed by this DNP student and the physician at the clinic. Categories to be included in the flowsheet include use of GDMT, echocardiographic results, and interventional procedures completed. Implementation of the flowsheet will be completed by clinical staff (RNs or CMAs) when completing chart prep for upcoming visits for all patients with one of the before-mentioned ICD-10 codes in their problem list. No additional costs will be incurred by the clinic with the addition of this process change.

There are few barriers to the implementation of this workflow. However, it does require that clinical staff recognize patients who require flowsheet documentation. Education regarding patients who qualify and require flowsheet documentation will be provided to clinical staff and providers. This education will include the ICD-10 codes previously mentioned and the components of the flowsheet. An instruction sheet will be provided to clinical staff and providers to serve as a reminder and guide to use of the flowsheet (see Appendix C).

There are many potential barriers to the initiation of GDMT in the treatment of heart failure, some of which may prevent the use of all four medications recommended by the ACC/AHA. Barriers noted in practice currently include other comorbidities, bradycardia, adverse reactions to medications, and cost of medications. Comorbidities that may preclude the use of GDMT include chronic kidney disease (CKD), chronic obstructive pulmonary disease (COPD), hyperkalemia, and asthma. Adverse reactions such as angioedema, urinary tract infections, yeast infections, and fatigue have the potential to preclude the use of GDMT. The flowsheet will contain a section to notate contraindications or intolerances to medical therapy.

The proposed workflow change for the clinic involves the recognition of patients with a heart failure diagnosis. The clinical staff at the practice will assess the patient's problem list when completing chart prep one to two weeks prior to the patient visit. If the patient has a heart failure diagnosis with one of the before-mentioned ICD-10 codes in the problem list, a flowsheet encounter will be created. The flowsheet will include information regarding current and past utilization of GDMT in the treatment of heart failure, echocardiographic results, and interventional procedures. The patient will be seen in the clinic for their scheduled appointment at which time the flowsheet will be available for review by the providers. If the flowsheet is not completed at the time of visit, the provider will bring this to clinical staff attention and ask that a flowsheet encounter be created. If changes to medical therapy are appropriate or needed, the provider will prescribe additional medical therapy for the treatment of heart failure. If additional medical therapy is utilized, a new flowsheet encounter will be created to notate the changes made, which can be completed by clinical staff or the providers themselves.

Evaluation and Analysis

Outcome analysis will be completed in three two-week cycles. Evaluation of utilization of flowsheets in those diagnosed with heart failure will be completed by this DNP student. At every two-week cycle, evaluation of patient appointments with a diagnosis of heart failure will be completed. The chart will be reviewed for completion of the flowsheet. The percentage of patients with heart failure with a flowsheet encounter created will be calculated with a goal of at least a 90% completion rate. Following visits, the number of medications utilized in the treatment of heart failure will be assessed with a goal of an increase in utilization of all four classes of medications recommended by ACC/AHA. The patients will also be assessed for

contraindications or intolerances to these medications. Data will be exported into an Excel worksheet without patient identifiers with yes or no answers for flowsheet completion and each recommended medication class. Flowsheet completion rates will be calculated with descriptive statistics with percentages documented. Percentages of patients on each medication recommended will be documented before and after the appointments. At the end of every two-week cycle, a debriefing with staff will occur to determine barriers to flowsheet completion and use of GDMT in the treatment of heart failure. Additionally, workflow efficiency will be assessed with a qualitative assessment questionnaire utilizing a Likert-scale and free-text answers formulated by this DNP student (see Appendix E). Data collected at each two-week cycle will be utilized to formulate changes to workflow that may be initiated in the following cycles.

Safety and Confidentiality

The implementation of this quality improvement project poses no more risk to the patients and staff than those already associated with treatment of their condition. The flowsheet will be integrated into the EMR, therefore, associated protected health information will be available only to those with password-protected access to the EMR. Information needed for the quality improvement project by this DNP student will be attained on-site from a secure computer and password-protected EMR. Data collected will include diagnosis of heart failure, medications currently being used for treatment, last echocardiogram, electrocardiogram results, and interventional procedures completed. The data will be entered into an excel spreadsheet for final analysis and organized by patient account number. Data provided to Montana State University (MSU) faculty will exclude name or date of birth in compliance with HIPAA. Health records from individual patients will not be removed from the clinic and data will be returned to the

clinic at the completion of the quality improvement project. The quality improvement project has support from key stakeholders to include the owner of the practice, physician, nurse practitioner, and clinical staff. Institutional Review Board (IRB) and committee approval is necessary prior to implementation of the project. The clinical site does not have an IRB, thus accepts MSU IRB approval without further needed site evaluation.

CHAPTER THREE

QUALITY IMPROVEMENT MANUSCRIPT

Contribution of Authors and Co-Authors

Manuscript in Chapter 3

Author: Megan Brinka

Contributions: Abstract, Clinical Problem, Review of Literature, Conceptual Framework, Aims of Project, Methods, Results, Conclusion

Co-Author: Marcy Hanson

Contributions: Editor, Project Chair

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Clinical Problem

Heart failure affects over 65 million people globally and 2.5% of Americans (Shahim et al., 2023). Of those in the United States with heart failure, 76% have heart failure with reduced ejection fraction (HFrEF) (Shahim et al., 2023). Those with heart failure have the highest incidence of 30-day readmission, with those with HFrEF demonstrating the highest one-year mortality at 37.5% (Savarese & Lund, 2017). Guideline-directed medical therapy (GDMT) in the treatment of heart failure has demonstrated a 73% reduction in all-cause mortality compared to no treatment with a 2-year all mortality rate of 35% without treatment (Bozkurt et al., 2023; Heidenreich et al., 2022). Rural communities, such as Montana, have higher rates of heart failure, 30-day readmission, and 90-day mortality when compared to urban counterparts (Pichan & DeVore, 2024; Turecamo et al., 2023). Much of this difference could be attributable to poorer overall health with higher rates other chronic illnesses, in addition to other challenges such as lower education levels, income disparities, substance use, and transportation issues (Pichan & DeVore, 2024). The stark numbers related to heart failure, hospital admission, and mortality demonstrate the need for additional intervention to ensure guideline therapy is being utilized in the treatment of patients with heart failure.

Review of Literature

Heart failure is one of the top three causes for hospitalization with total healthcare costs related to heart failure in 2018 being \$179.5 billion (Bozkurt et al., 2023; Shahim et al., 2023). When guideline directed medical therapy (GDMT) with angiotensin converting enzyme inhibitors (ACEi)/angiotensin receptor blockers (ARB)/angiotensin receptor-neprilysin inhibitors

(ARNi), beta blockers, mineralocorticoid receptor agonists, and sodium-glucose cotransporter-2 inhibitors is initiated there is a 27-45% decrease in mortality and 30-day readmission significantly decreased (Chin et al., 2016; Grewal et al., 2021; Nguyen et al., 2020). Despite this, there is a significant treatment gap in the management of systolic heart failure with prescribing rates of GDMT ranging from 24.7% to 84%, amongst the four medication classes (Chin et al., 2016; Grewal et al., 2021). Utilization of ACEi/ARB/ARNi demonstrates overall lower mortality and hospitalization rates, with ARNi's demonstrating the most significant positive impact (Chang et al., 2019; Landolfo et al., 2020; McMurray et al., 2014; Park et al., 2023). Treatment with SGLT2i's demonstrates significant improvement in heart failure symptoms, ejection fraction, and ventricular remodeling while also reducing mortality and hospitalization rates (Carluccio et al., 2023; McMurray et al., 2019). While use of beta-blockers such as Metoprolol and Carvedilol demonstrated a 31-33% reduction in hospitalization and 19-24% improvement in mortality (Hjalmarson et al., 2000; Packer et al., 2002).

The significant impact of GDMT use on heart failure symptoms, mortality, and hospitalization demonstrates the necessity of individual providers adhering to recommendations to in the treatment of those with HFrEF. The use of flowsheets in other chronic diseases such as chronic obstructive pulmonary disease (COPD) and diabetes has demonstrated improvement in adherence to guidelines and recommendations. Additionally, flowsheets have demonstrated improvement in screening, prescribing of medications, and reduction in clinical markers such as A1C (Terasaki et al., 2015; Valencia & Dols, 2021).

Conceptual Framework

The conceptual framework utilized for this quality improvement project was the Plan-Do-Study-Act (PDSA) model (Improvement, N.d.). This model allows for adaptation of the intervention to improve chances of noting the desired change (Improvement, N.d.).

Plan

The providers and clinical staff at the organization noted a need for improvement in adherence to guideline directed medical therapy and efficiency in reviewing prior records. Literature review demonstrated the extreme importance of maintaining patients with HFrEF on GDMT. It also revealed integrated flowsheets improved patient outcomes and adherence to guidelines in other chronic illnesses such as COPD and diabetes.

Do

Heart failure flowsheets were created during chart preparation for each patient with a diagnosis of systolic heart failure (HFrEF) or cardiomyopathy during the implementation period. The flowsheet included aspects such as type of cardiomyopathy, New York Heart Association Class, last echocardiographic results, medical therapy initiated or trialed, contraindications to medical therapy, ischemic evaluations, and additional interventional procedures. Flowsheets were reviewed by providers prior to the patient appointment and appropriate changes to medical therapy were made during appointments.

Study

Flowsheet completion rates were reviewed biweekly. Utilization of GDMT was also reviewed biweekly with review of completed flowsheets. Notes were made in the Excel flowsheet to

delineate reasons as to why a patient may not be able to or need to be on all four classes of medications.

Act

After each 2-week PDSA cycle, in-site meetings took place to assess efficiency of flowsheet use and potential improvements to current process. Adaptations to workflow were completed as needed to allow for ease of use with both the clinical staff and providers.

Aims

This quality improvement project aimed to improve efficiency in caring for patients with heart failure by utilizing an integrated flowsheet delineating aspects of care in the electronic medical records (EMR). The project aimed for at least 90% utilization of the heart failure flowsheet in all patients evaluated during the 6-week implementation period. Furthermore, expecting at least mild increase in the utilization of GDMT in the treatment of heart failure. A specific increase in medication utilization was not delineated due to the multitude of complex reasons that a patient may not be able to take certain medications. Long-term goals included improved outcomes in the treatment of heart failure patients with continued increase in GDMT prescription, reduction in hospitalization, and improved quality of life. However, these goals are outside the scope of the current project.

Methods

Context

The clinical site is a privately owned cardiovascular clinic in North Central Montana. The practice is comprised of one physician and one nurse practitioner. The physician performs

procedures to include electrophysiology studies, heart catheterizations, and pacemaker/implantable cardioverter defibrillator placement. There are two nurses (RN), one certified medical assistant (CMA), two certified nursing assistants (CNAs), and three front staff, one of which schedules procedures for the physician at the hospital. The clinic utilizes an electronic medical record, eClinicalWorks, with no paper charting completed in the office. As of October 2024, the clinic had seen 3,891 patients in the last 2 years, with 507 patients having a diagnosis of heart failure or cardiomyopathy in their problem list.

Intervention

An integrated flowsheet to be included in the electronic medical records was created to be utilized for all patients with a diagnosis of heart failure or cardiomyopathy evaluated during the six-week implementation period. The flowsheet included type of cardiomyopathy (ischemic versus nonischemic), New York Heart Association class, echocardiographic results including ejection fraction, medical therapy initiated or trialed, contraindications to medical therapy, electrocardiogram results, ischemic evaluation, and presence of cardiac devices.

Each week, the registered nurse or certified medical assistant completed chart preparation for the patients scheduled for the following week. If the patient had a diagnosis of heart failure or cardiomyopathy with ICD-10 codes I42.9, I25.5, I42.8, I50.20, I50.42, or I50.22 in the problem list, an integrated heart failure flowsheet encounter was created in the electronic medical record. Prior visits were reviewed by the RN or CMA to assess for contraindications to medical therapy and information was imported into the flowsheet. When the patient presented for their scheduled visit, the providers reviewed prior note and flowsheet documentation. Upon symptom review, review of prior studies, and assessment of patient clinical situation, assessment for addition of

medical therapy was considered and implemented at visit if appropriate by the physician and nurse practitioner.

Measures

Evaluation of outcomes was completed in three two-week cycles. After two weeks, appointments were reviewed via registry data for heart failure or cardiomyopathy diagnosis utilizing ICD-10 codes before-mentioned. Patients with a heart failure diagnosis seen within the two-week period were exported into an Excel worksheet utilizing patient account numbers in compliance with HIPAA. The chart was reviewed for a completed heart failure flowsheet. This information was then exported to the excel worksheet using yes or no answers. Additionally, current medical therapy for each patient was exported into the flowsheet, including number of medications prescribed before and after appointment. After every two-week cycle, an on-site debriefing was completed with the staff and providers to assess for potential barriers to utilization of the flowsheet and/or initiation of GDMT. Additionally, a Likert-scale questionnaire was provided to providers and clinical staff (RN and CMA) to assess barriers and benefits of the intervention (see Table 1.1). The questionnaire includes questions regarding clarity of new established workflow, efficiency in medical decision making, usability of flowsheet, stress levels, and communication.

Table 1.1 Workflow Efficiency Questionnaire

Workflow Efficiency Questionnaire										
How clear and well-defined are the tasks in the workflow on a scale of 1 to 10? With 1 being not well-defined and 10 being extremely well-defined.	1	2	3	4	5	6	7	8	9	10

Table 1 Continued

How has the flowsheet impacted efficiency in medical decision making on a scale of 1 to 10? With 1 being not at all and 10 being extremely helpful.	1 2 3 4 5 6 7 8 9 10
How user-friendly is the flowsheet within the current workflow on a scale of 1 to 10? With 1 being not at all user-friendly and 10 being extremely user-friendly.	1 2 3 4 5 6 7 8 9 10
How has the flowsheet impacted stress level and workload on a scale of 1 to 10? With 1 being has severely negatively impacted stress level/workload and 10 being has had an extremely positive impact on stress level/workload?	1 2 3 4 5 6 7 8 9 10
How has the flowsheet impacted communication within the clinic on a scale of 1 to 10? With 1 being it hasn't impacted communication at all and 10 being it has positively impacted communication.	1 2 3 4 5 6 7 8 9 10

Analysis

Analysis was completed utilizing descriptive statistics, dividing the number of patients with a completed heart failure flowsheet by the number of patients with a heart failure diagnosis seen during the implementation period. Additionally, descriptive statistics was utilized to assess percentage of patients on each of the four classes of medications evaluated during the implementation period. Finally, an assessment was completed regarding the percentage of patients on all four classes of medications, versus those on three, two, one, or none. Additionally, analysis was completed regarding the reasoning for lack of utilization of medical therapy, some of which included improvement in heart function with less medication, comorbidities requiring discontinuation of one or more medications, finances including out-of-pocket costs, etc. Finally,

the Likert-style questionnaire was analyzed to assess the impact of current workflow on staff and providers.

Results

Seventy-seven patients with a diagnosis of heart failure or cardiomyopathy were seen and evaluated during the implementation period. The goal for this quality improvement project was at least 90% utilization of the heart failure flowsheet.

Thirty patients with a diagnosis of heart failure were seen within the first two-week implementation period. Of these patients, 70% had a completed heart failure flowsheet in the EMR. Regarding medical therapy, 98% were on ACEi/ARB/ARNi, 90% were on a beta blocker, 43% were on an MRA, and 33% were on a SGLT2 by the end of the two-week period. During debriefing with staff, one clinical staff member (CMA) did not feel as invested in the practice change, feeling that it negatively impacted the workload rating in the lower third of the Likert-scale questionnaire on all questions. The providers and other clinical staff member (RN) rated in the upper third of the Likert-scale questionnaire on the majority of questions. Additional education was provided to clinical staff at this time to increase confidence in appropriate use of the flowsheet. The importance of flowsheet completion was reinforced by this DNP student and the physician. Additional workflow was added for the following PDSA cycles for the second clinical staff member to assess charts for the nurse practitioner to assure flowsheet completion prior to patient appointments. Assessment of difficulties in prescribing all four classes of medication will be discussed below.

During the second two-week period, twenty-one patients with a diagnosis of heart failure or cardiomyopathy were evaluated. Of those, 100% had a flowsheet encounter created.

Regarding medical therapy, 90% were on ACEi/ARB/ARNi, 95% were on a beta-blocker, 66% were on an MRA, and 71% were on an SGLT2. During debriefing, clinical staff members and providers felt a positive impact on workflow and efficiency, again scoring in the upper-third on all questions on the Likert-scale questionnaire. By this time, the uninvested clinical staff member had resigned her position at the office and was no longer a limiting factor in the utilization of the flowsheet. The physician felt the flowsheet created additional steps to the workflow, however, impacted efficiency by providing necessary information in one specific place. He continued to feel positive impacts and felt that additional flowsheets could be created for other chronic illnesses such as atrial fibrillation and valvular disease.

During the third two-week implementation period, twenty-six patients with a diagnosis of heart failure or cardiomyopathy were evaluated. Of those, 100% had a flowsheet encounter created. Regarding medical therapy, 84% were on an ACEi/ARB/ARNi, 96% were on a beta blocker, 57% were on an MRA, and 69% were on an SGLT2. During debriefing, providers felt the flowsheet had impacted the way they treat heart failure and assess for addition of medications. Workflow and efficiency were greatly impacted, with providers feeling that they have more tools to ensure GDMT is utilized in appropriate patients. The clinic continued to brainstorm additional flowsheets that could be utilized in other chronic diseases and were excited about the possibilities for other patient populations.

Overall, seventy-seven patients with heart failure or cardiomyopathy were evaluated during the six-week implementation period. Of those, 88% had a flowsheet encounter created. Regarding medications, 88% were on an ACEi/ARB/ARNi, 70% were on a beta-blocker, 52% were on an MRA, and 56% were on an SGLT2. Of those, 36% were on all four classes of

medications, 27% were on three, 30% were on two, 9% were on 1, and 1% were on zero. Of the 49 patients not on all four medications, 35 (71%) had a reason documented as to why they were not on all four classes of medication. These reasons included cost (5%), comorbidities (17%), improvement in ejection fraction after heart rate control/revascularization (40%), plan to reassess heart function and add medications if still reduced (28%), and patient discontinued on their own volition (8%). Of the patients evaluated during the implementation period, six had additional medications added to their heart failure regimen during their evaluation. Of those with addition of medications, all had flowsheet encounter created.

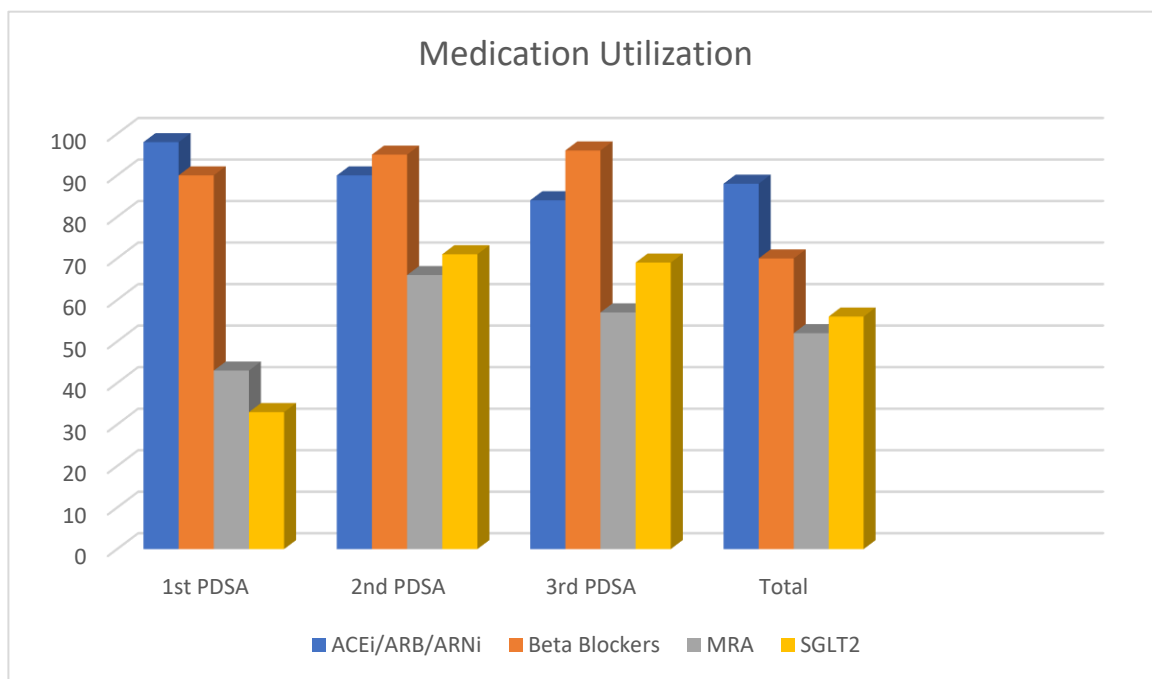


Figure 3.1 Medication Utilization

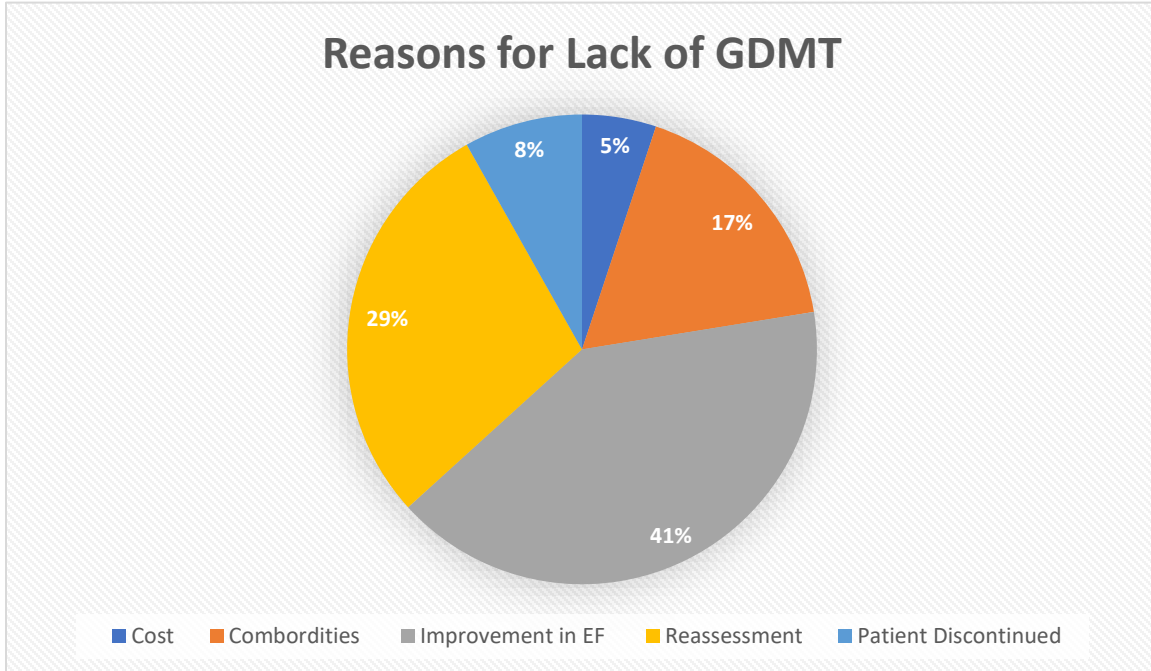


Figure 3.2 Reasons for Lack of Guideline Directed Medical Therapy

Regarding the Likert-style questionnaire dedicated to assessment of workflow efficiency, generally, scores were in the upper third on a scale of 1 to 10 on the majority of questions. The providers and registered nurse demonstrated clear, well-defined tasks, improvement in efficiency, usability and enhanced communication, with answers to these questions between 7 and 10 throughout the implementation period. Providers did not feel a significant impact on stress level and workload rating in the middle, at 5, on this question. Nursing staff did feel somewhat of an increase in stress level rating at 3-4 throughout the implementation period on this question. The other clinical staff (certified medical assistant) scored in the lower-third on all questions during the first PDSA cycle. Unfortunately, by the second PDSA cycle, this clinical staff member had resigned her position and reassessment was not possible. However, they noted a lack of time to

complete flowsheet documentation contributing to increased stress and lack of buy-in to the intervention.

Discussion

Unfortunately, during this quality improvement project, we were unable to reach the primary endpoint. Despite 100% utilization in the last four weeks of the project, the lack of flowsheet documentation in the first PDSA cycle significantly impacted reaching the project goal of 90% flowsheet utilization. However, flowsheet documentation subjectively demonstrated improvement in workflow efficiency from the provider standpoint with workflow efficiency questionnaire demonstrating answers in the upper third of the Likert-scale questionnaire (see Table 1.1). There was mild improvement in adherence to GDMT with flowsheet utilization. However, the project provided important insights into the reasons patients are not on all four classes of medications. While the numbers may appear to demonstrate significantly reduced utilization of medications, 41% of patients not on all four classes of medications had a significant improvement in left ventricular function with restoration of normal sinus rhythm with medications/electrical cardioversion or coronary revascularization, eliminating the need for GDMT for treatment of cardiomyopathy. While 29% have a plan for reassessment of left ventricular function with addition of medications if still reduced.

Limitations

The significant limitation in this quality improvement project was buy-in from clinical staff. While providers were excited about the prospects of the intervention, motivation and determination were lacking from key stakeholders (Certified Medical Assistant) involved in the

process change. Therefore, the intervention was not implemented on all patients with a diagnosis of heart failure or cardiomyopathy. This lack of utilization could have impacted the secondary endpoint of increased adherence to guideline directed medical therapy. However, there were multiple factors contributing to lack of utilization of all four classes of medications in the treatment of heart failure. One of the largest factors contributing to this were patient specific limitations such as comorbidities, cost, and patient discontinuation.

Recommendations

Continued utilization of the flowsheet requires additional reinforcement of the intervention to ensure staff buy-in and motivation. Initial education regarding the flowsheet was provided by this DNP student, however, there may have been increased utilization by staff if the providers expressed the importance of the flowsheet in their workflow. As additional clinical staff enter the facility, it would be recommended that providers also express the importance of this intervention to ensure proper and consistent use. The flowsheet did demonstrate subjective improvement in workflow and efficiency. Additional flowsheets for a variety of chronic illnesses such as atrial fibrillation and valvular disease, may be beneficial for use to enhance current workflow and adherence to guideline therapy regarding medication utilization and echocardiographic reassessment. As stated prior, flowsheets have shown to be beneficial in other chronic diseases such as COPD and diabetes demonstrating improved adherence to guideline therapy and improved patient outcomes (Terasaki et al., 2015; Valencia & Dols, 2021). The success of flowsheet utilization in other chronic illnesses provides evidence to support utilization in the setting of heart failure as adherence to guideline therapy has demonstrated improvement in patient quality of life and outcomes.

Conclusion

Heart failure is a large contributor to patient hospitalization and can negatively impact quality of life. Adherence to guideline-directed medical therapy has demonstrated to improve patient outcomes and symptoms related to heart failure. Implementing a flowsheet to delineate aspects of heart failure care in this private practice demonstrated subjective improvement in workflow and efficiency with mild improvement in utilization of GDMT. While the QI project did not meet its primary end point, the site gained perspective into factors contributing to lack of utilization of GDMT. These findings will continue to guide the clinic in decision-making regarding heart failure management.

CHAPTER FOUR

ADVANCED NURSING ESSENTIALS REFLECTION

The American Association of Colleges of Nursing (AACN) delineates essentials and core competencies to nursing education (AACN, 2021). The essentials are meant to be pertinent across all nursing specialties and easily understood among other healthcare professionals, reflecting on disease prevention, health promotion, chronic disease care, restorative care, and palliative care (AACN, 2021). Additionally, to be applicable to the diverse populations and across the lifespan of individuals that are treated by nurses and advanced practice nurses. The following chapter aims to reflect on the components of the Montana State University graduate program that impacted my understanding of nursing practice and the essentials lined out by the AACN.

Domain 2: Person-Centered Care

The second domain instills the need for person-centered care, providing healthcare that focused on individuals and family's needs while providing compassionate, evidence-based care that is appropriate for each individual (AACN, 2021). Each class within the DNP program provides the basis for this domain. However, I feel that my eyes were really opened to this in the advanced clinical courses. I was fortunate enough to do clinicals at two different Federally Qualified Health Center (FQHC) facilities, which gave me a new perspective on the creative care that may need to be provided to our high-risk, vulnerable populations. Many of the patients seen during these clinical rotations had limited financial resources, requiring critical thinking and compassionate care to decide the necessary steps for their particular condition to avoid high

healthcare costs for the individual. Additionally, during clinicals, I had to quickly develop rapport with patients and establish a therapeutic relationship given that they were expecting to be seeing their usual provider. This provided me with invaluable experience in the development of relationships with my patients.

Additionally, Vulnerability and Healthcare Diverse Communities provided important insight into the need for person-centered care. Assignments in this class focused on establishing and recognizing our own personal biases and privileges in the setting of healthcare. Furthermore, it requires a deeper level of thinking and understanding regarding a particular vulnerable population and finding solutions to providing them with high-quality, evidence-based care. Additional courses that contribute to this domain include Design of Healthcare Delivery Systems, Ethics, Law, Policy, and Healthcare, and Program Planning and Evaluation.

The didactic and clinical coursework throughout the DNP program provided me indispensable experience in the need for providing person-centered care. I will carry with me the experiences from the FQHC facilities as a guide to understanding and working through potential financial difficulties of my patients in the future. Additionally, I was really able to concentrate on developing a rapport with patients quickly, which I know will significantly impact my practice and provide me with the ability to develop therapeutic relationships with my patients.

Coursework in Design of Healthcare Delivery Systems, has provided me the education to constantly assess processes within the clinics I am working in to find potential problems and brainstorm solutions to systems level obstacles in the care of patients. This will continue to be important in my practice and allow me to continue evaluating processes at my future workplace.

Domain 3: Population Health

The population health domain focuses on the collaborative practice in the healthcare industry that provides care to improve the outcomes and health status of a particular population or group of people (AACN, 2021). From my point of view, this is most encompassed within NRSG 675, through my work with the DNP scholarly project. The project has focused my attention on having a collaborative and patient-centered approach to recognizing and addressing a problem within the practice setting. The project has allowed me to analyze population (clinic) data to assess current practices and compare those practices to the current standard of care. Additionally, providing insights to stakeholders about potential practice problems and developing ways to improve upon current practice to align with standards of care. The project recognizes the needs of a certain population while utilizing evidence-based care to address a practice problem while also recognizing patient constraints such as finances, comorbidities, and polypharmacy.

I was also exposed to the fundamentals of population health in other courses such as the advanced clinical courses, pathophysiology, and pharmacology. All courses instilled current recommendations for preventative health practices, such as colonoscopies, mammograms, laboratory studies, pap smears, and vaccination recommendations. Additionally, instilling potential patient constraints and necessary interprofessional collaboration for patient-centered care.

The importance of population health has been instilled throughout the DNP program. The education provided regarding preventative health medicine, potential patient constraints to receiving healthcare, and understanding standard of care will be invaluable in my future practice.

The scholarly project has provided me with a basis for quality improvement and will be influential in developing potential change in my practice setting as a nurse practitioner. The most important aspect that will stay with me as a transition into the provider role is understanding the individual needs of your patients and how their particular situation may impact their care. Additionally, finding creative ways to provide care to patients that may have limited resources, whether it be financial, transportation, or familial support, to provide them with the best care possible.

Domain 4: Scholarship for the Nursing Discipline

The fourth domain focuses on inclusion of research, studies, theory, analysis of data, and education (AACN, 2021). The entirety of the DNP program focuses research and education surrounding the nursing discipline. However, a number of courses specifically focus on education and evidence-based practice. The first of which being the DNP Scholarly Project, as this course provides a basis for gaining a deeper understanding of a particular topic and applying multiple different aspects of nursing care into caring for our population. The scholarly project incorporates topics from Evidence Based Practice, Statistical Applications, NRS 614 Vulnerability, Program Planning and Evaluation, and Design of Healthcare Delivery Systems, to name a few. Aspects from all of these courses provide a deeper level of understanding regarding practicing medicine, but particularly practicing medicine with a focus from the nursing perspective which includes incorporation of evidence-based practice, development and application of nursing theory, and education for both us and our patients.

Domain 5: Quality and Safety

Healthcare quality and safety is the main topic of domain five, tying in enhancement of quality, reduction in harm, and improvement in quality processes within the healthcare delivery system (AACN, 2021). Exposure to this domain is most notable in Design of Healthcare Delivery Systems, providing students with the opportunity to evaluate processes at different healthcare settings and levels to assess efficiency and safety, while allowing for recognition for improvement in healthcare delivery systems. Classes such as Finance and Budget of Healthcare Systems, provided the basis for understanding the financial aspects of care delivery and considerations for providing efficient, cost-effective care. Additionally, providing invaluable knowledge regarding providing fiscally responsible care for both the patients and the practice providing care.

The quality and safety domain were further exemplified through the DNP scholarly project. The project provided an avenue to assess all areas of care from delivery of care to financial aspects of care to quality care based upon evidence-based practice. Through the project, I was able to evaluate clinic practices for potential populations that may benefit from improved practices, further implementation of evidence-based care, and implementation of informatics for improved quality of care. Additionally, evaluating business and clinical practices to implement a quality improvement project with the intention of improving quality of care and patient outcomes.

The quality and safety domain will continue to significantly impact my practice in the future. The overall goal of care for patients is to provide high-quality, safe, evidence-based care. Aspects of every course throughout the DNP program instills quality and safety as a top priority.

Through the DNP coursework, I realized that keeping the status quo without questioning possible improvements leaves us stagnant as providers. The program has demonstrated multiple ways to assess care practices and recognize potential improvements, I will continue to utilize these ideals to evaluate practices throughout my career to ensure continued quality care is provided to patients.

Domain 7: Systems-Based Practice

Systems-based practice focuses on providing proactive, effective care to patient populations demonstrating the ability to provide resources for safe and quality care to a diverse range of patients (AACN, 2021). This nursing domain was exemplified in Vulnerability and Healthcare Diverse Communities by providing education regarding the many different populations of patients we may encounter throughout our practice and instilling the need to come up with creative solutions and plans to address their complex healthcare needs. Evaluation of the projects for this class exemplified the amazing things that can be done when a team comes together to address a practice problem with a focus on providing healthcare services to diverse, vulnerable populations in our community. Additionally, my clinical coursework provided me with vast insights into the needs of our vulnerable populations as I was able to participate in clinicals at FQHC facilities, providing care to underserved populations. I gained insight into the creative care that may need to be provided in situations where financial constraints may impede the ability of a patient to seek out medical care. Classes such as Design of Healthcare Delivery Systems, Finance and Budgets of Healthcare Systems, and Program Planning provided the groundwork for evaluating healthcare systems, budgets, and programs to provide more cost-effective and efficient care from the systems level.

This coursework provided the groundwork for evaluating the effectiveness of care provided, as well as cost-effectiveness, both for the patient and the system. I will continue to build on the education provided throughout the DNP program to evaluate the system that I work in and assess for positive change to improve patient care. Additionally, I will utilize concepts learned in Finance and Budgets, Healthcare Delivery Systems, and Program Planning to assess for potential change in the setting in which I am working to improve workflow efficiency, reimbursements, and safety. The vulnerability course impressed upon me the necessity of understanding and recognizing the needs of everyone, which is invaluable in practice, and I will continue to carry with me to ensure person-centered care that is individual to each person's situation.

Conclusion

Classes such as the DNP Scholarly Project demonstrated scholarship, population health, and quality and safety. Additional coursework provided insights into the special circumstances experienced by many of our patients and the creative solutions that could be instilled by providers to ensure quality, patient-centered care. Clinical coursework provided the basis for establishing therapeutic relationships with patients, assessing individual needs, and making evidence-based decisions based on specific patient needs. The wide array of coursework and education provided by Montana State University greatly impacted my ability to meet the expectations and core competencies expected by the AACN.

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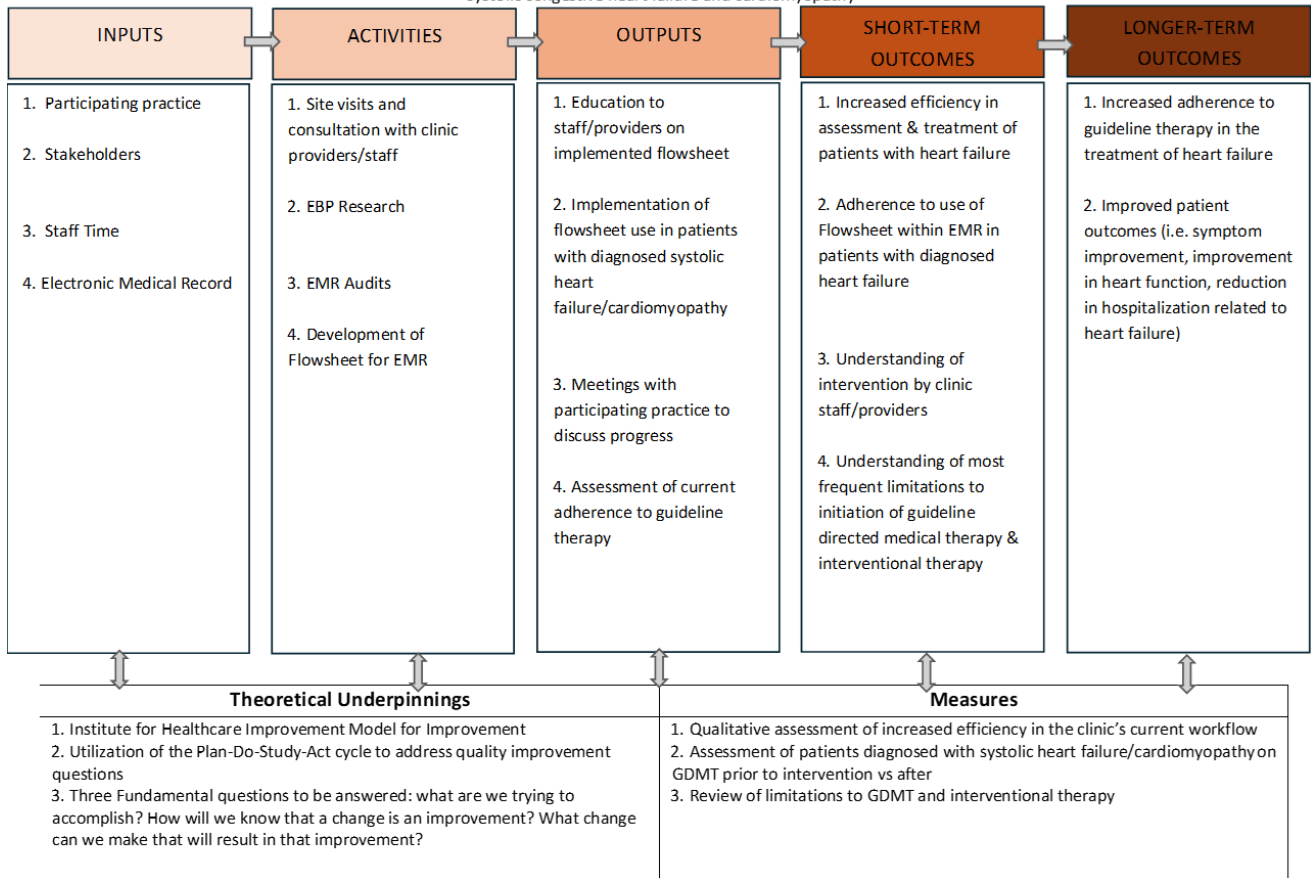
APPENDICES

APPENDIX A

LOGIC MODEL

Evidence-Based Project Implementation for the Adherence to Guideline Therapy for the Treatment of Systolic Heart Failure

A project supporting an independent Cardiovascular practice in maintaining adherence to guideline directed medical and interventional therapy in the treatment of patients with systolic congestive heart failure and cardiomyopathy



APPENDIX B

INTEGRATED FLOWSHEET

Heart Failure	
Type	
NYHA Class	
Echo	
Date	
Ejection Fraction	
LVIDd	
LVIDs	
Medications	
ACEi, ARB, ARNi	
Contraindications or Intolerance	
Beta Blockers	
Contraindications or Intolerance	
SGLT2i	
Contraindications or Intolerance	
MRAs	
Contraindications or Intolerance	
Ischemic Evaluation	
Date	
Type	
EKG	
Date	
Heart Rhythm	
BBB	
QRS Duration	
Device	
Type	

APPENDIX C

EMPLOYEE EDUCATION

Employee Education

Heart Failure Flowsheet

In an effort to streamline evaluation and management of patients with heart failure and adhere to guideline directed medical therapy, the practice will be instituting a heart failure flow sheet. The flowsheet will have the following components:

1. Heart failure diagnosis with NYHA class
2. Echocardiogram results
3. Current medical therapy for treatment of heart failure
 - a. Contraindications to medical therapy
 - b. Prior intolerance to medical therapy
4. EKG results, including presence of bundle branch block, heart rhythm, and QRS duration
5. Prior ischemic evaluation and type (i.e. nuclear medicine stress test, stress echocardiogram, heart catheterization)
6. Presence of device (i.e. ICD, biventricular ICD, biventricular pacemaker, dual or single chamber pacemaker)

A flowsheet encounter should be created on all patients with a diagnosis of heart failure. If the patient has one of the following ICD-10 codes in their problem list, a flowsheet encounter will need to be created:

- I42.9 Cardiomyopathy, unspecified
- I25.5 Ischemic Cardiomyopathy
- I42.8 Nonischemic cardiomyopathy
- I50.20 Systolic Congestive Heart Failure
- I50.42 Combined Systolic & Diastolic Congestive Heart Failure
- I50.22 Chronic Systolic Congestive Heart Failure

The flowsheet will easily flow into the current workflow. When prepping charts for upcoming appointments, if the patient has one of the above ICD-10 codes, the flowsheet encounter should be filled out in preparation for their appointment. Additionally, the flowsheet will need to be updated with any interval changes.

If you have any questions in this regard, please do not hesitate to reach out to ensure proper utilization of flowsheet and data.

APPENDIX D
SMART GOALS

SMART Goal #1: The heart failure flowsheet will be utilized in at least 90% of patients with a diagnosis of heart failure during the implementation period.		
- Stakeholders, to include providers and clinical staff at the cardiology clinic, will develop a flowsheet detailing data imperative to the evaluation and treatment of those with heart failure - Education will be provided to providers and clinical staff detailing the components of the heart failure flowsheet and patients requiring the creation of flowsheet encounters - Evaluation of individuals in the clinic with a diagnosis of heart failure		
Data to be collected	Collection Process	Planned data analysis
- Number of patients seen during implementation period with a diagnosis of heart failure - Number of patients with heart failure with flowsheet encounters created during the implementation period	DNP student will evaluate the number of patients with heart failure seen during implementation period by querying the EMR	Percentage of patients with heart failure that had flowsheet encounter created
SMART Goal #2: There will be an increase in use of all four medications utilized in GDMT for the treatment of heart failure		
- Clinical staff will fill out flowsheets prior to patient encounters - Providers will review heart failure flowsheets to review pertinent data and determine if the patient is eligible/may benefit from medication changes in the treatment of heart failure - If new medications are added, flowsheet encounter will be updated to provide up to date information in the flowsheet		
Data to be Collected	Collection Process	Planned Data Analysis
- Number of patients with heart failure seen in the implementation period - Number of patients with heart failure in each class of medication: ACEi/ARB/ARNi, beta-blockers, SGLT2i, MRAs	- DNP student will evaluate the number of patients seen with heart failure during the implementation period by querying the EMR - DNP student will evaluate which patients are on each class of medications in GDMT by querying the EMR	- Number of patients with heart failure seen in the implementation period - Percentage of these patients that are on each of the 4 medication classes

APPENDIX E

WORKFLOW EFFICIENCY QUESTIONNAIRE

Workflow Efficiency Questionnaire

Heart Failure Flowsheet

1. How clear and well-defined are the tasks in the workflow on a scale of 1 to 10? With 1 being not well-defined and 10 being extremely well-defined.

1 2 3 4 5 6 7 8 9 10

2. How has the flowsheet impacted efficiency in medical decision-making on a scale of 1 to 10? With 1 being not at all and 10 being extremely helpful.

1 2 3 4 5 6 7 8 9 10

3. How user-friendly is the flowsheet within the current workflow on a scale of 1 to 10? With 1 being not at all user-friendly and 10 being extremely user-friendly.

1 2 3 4 5 6 7 8 9 10

4. How has the flowsheet impacted stress level and workload on a scale of 1 to 10? With 1 being has severely negatively impacted stress level/workload and 10 being has had an extremely positive impact on stress level/workload?

1 2 3 4 5 6 7 8 9 10

5. How has the flowsheet impacted communication within the clinic on a scale of 1 to 10? With 1 being it hasn't impacted communication at all and 10 being it has positively impacted communication.

1 2 3 4 5 6 7 8 9 10

6. Please add additional free-text comments regarding the utilization of the flowsheet in the current workflow, including positive and negative impacts and suggestions for improvement.
