PROJECT BOOST AND CARDIOVASCULAR DISEASE READMISSIONS IN A RURAL ACUTE CARE FACILITY

by

Jennifer LS Armfield

A DNP Project Submitted to the Faculty of the

COLLEGE OF NURSING

In Partial Fulfillment of the Requirements
For the Degree of

DOCTOR OF NURSING PRACTICE

In the Graduate College

THE UNIVERSITY OF ARIZONA

2 0 1 6

THE UNIVERSITY OF ARIZONA
GRADUATE COLLEGE

As members of the DNP Project Committee, we certify that we have read the DNP Project prepared by Jennifer LS Armfield entitled Project BOOST and Cardiovascular Disease Readmissions in a Rural Acute Care Facility and recommend that it be accepted as fulfilling the DNP Project requirement for the Degree of Doctor of Nursing Practice.

_____ Date: November 17, 2016
Shu-Fen Wung, PhD, RN, ACNP-BC, FAAN

_____ Date: November 17, 2016
Ann Rosenfeld, PhD, RN, FAHA, FAAN

_____ Date: November 17, 2016
Carrie J. Merkle, PhD, RN, FAAN

Final approval and acceptance of this DNP Project is contingent upon the candidate's submission of the final copies of the DNP Project to the Graduate College.

I hereby certify that I have read this DNP Project prepared under my direction and recommend that it be accepted as fulfilling the DNP Project requirement.

_____ Date: November 17, 2016
DNP Project Director: Shu-Fen Wung, PhD, RN, ACNP-BC, FAAN

STATEMENT BY AUTHOR

This DNP Project has been submitted in partial fulfillment of requirements for an advanced degree at The University of Arizona and is deposited in the University Library to be made available to borrowers under rules of the Library.

Brief quotations from this DNP Project are allowable without special permission, provided that an accurate acknowledgement of the source is made. Requests for permission for extended quotation from or reproduction of this manuscript in whole or in part may be granted by the head of the major department or the Dean of the Graduate College when in his or her judgment the proposed use of the material is in the interests of scholarship. In all other instances, however, permission must be obtained from the author.

SIGNED: __Jennifer LS Armfield_____

ACKNOWLEDGMENTS

I want to acknowledge my committee members, Dr. Shu-Fen Wung, Dr. Ann Rosenfeld, and Dr. Carrie Merkle, for their support and encouragement in completing this DNP project. I want to acknowledge Dr. Laura Szalacha for her patience, guidance, and mentorship that facilitated completion of this academic endeavor. I also want to acknowledge Dr. Cynthia Beckett and the research team at Flagstaff Medical Center Evidence Based Practice department for allowing me to be a part of the research team.

DEDICATION

I want to dedicate this DNP Project to my husband, Shadow. This endeavor was not possible without your constant encouragement, support, and belief in me. I owe my success to you.

I also want to dedicate this DNP Project to my children, Willow and Justice. While you may not know it, your support and beautiful spirits kept me going when I wanted to quit.

TABLE OF CONTENTS

LIST OF ABBREVIATIONS....8

LIST OF FIGURES....9

LIST OF TABLES....10

ABSTRACT....11

CHAPTER 1: INTRODUCTION....12

Project BOOST....12

Background....14

Purpose of the Project....16

CHAPTER 2: LITERATURE REVIEW....17

Significance to Clinical Practice....18

CHAPTER 3: METHODS....20

Specific Aims....20

Research Design....20

Setting....20

Study Sample....21

Instruments....21

Data Collection and Management....27

Human Subject Protection....28

CHAPTER 4: RESULTS....29

Sample Characteristics....29

CHAPTER 5: DISCUSSION....45

TABLE OF CONTENTS - *Continued*

Limitations.....47

Future Studies.....47

Conclusion.....48

APPENDIX A: LETTER OF SUPPORT FROM STUDY SITE.....49

APPENDIX B: INSTITUTIONAL REVIEW BOARD APPROVAL.....51

APPENDIX C: LETTER OF ADDITION TO FLINN GRANT.....53

APPENDIX D: FLINN FOUNDATION PROJECT EXECUTIVE SUMMARY.....56

APPENDIX E: 8P RISK ASSESSMENT TOOL.....59

APPENDIX F: GENERALIZED ASSESSMENT OF PREPAREDNESS.....61

APPENDIX G: PATIENT HEALTH QUESTIONNAIRE-9.....63

APPENDIX H: HEALTH LITERACY ASSESSMENT.....65

REFERENCES.....67

LIST OF ABBREVIATIONS

AHA – American Heart Association

AMI – Acute Myocardial Infarction

CAD – Coronary Artery Disease

CVD – Cardiovascular Disease

CMS – Centers for Medicare and Medicaid Services

COPD – Chronic Obstructive Pulmonary Disease

DM – Diabetes Mellitus

EF – Ejection Fraction

EHR – Electronic Health Record

ESRD – End Stage Renal Disease

GAP – Generalized Assessment of Preparedness

HF – Heart failure

IPOC – Interdisciplinary Plan of Care

NSTEMI – Non-ST-Elevation Myocardial Infarction

PHQ-9 – Patient Health Questionnaire

PNA – Pneumonia

Project BOOST – Better Outcomes for Older adults through Safe Transitions

REALM – Rapid Estimate of Adult Literacy in Medicine

STEMI – ST-Elevation Myocardial Infarction

THA – Total Hip Arthroplasty

TKA – Total Knee Arthroplasty

LIST OF FIGURES

FIGURE 1. An Example of the Readmission Prevention Interdisciplinary Plan of Care 22
FIGURE 2. Comparison Analysis of 8P Risk Factors for Pre- and Post-intervention 33

LIST OF TABLES

TABLE 1. Patient demographic characteristics for the pre- and post-BOOST samples. 30

TABLE 2. Patient medical characteristics for the pre- and post-BOOST samples 31-32

TABLE 3. 8P characteristics for the pre- and post-BOOST periods 34

TABLE 4. Intervention and readmission for the pre- and post-BOOST period (n = 207) 35

TABLE 5. Bivariate logistic regression examining the relationships between demographic characteristics, medical characteristics, and risk factors and hospital readmission (n = 207).....37

TABLE 6. Logistic regression modeling of hospital readmission in 30 days and the 8P risk assessment tool.....43

TABLE 7. Alternate analysis of logistic regression modeling of hospital readmission in 30 days and the 8P risk assessment tool.....44

ABSTRACT

Hospital readmissions are a source of reduced payment as mandated by the Centers for Medicare and Medicaid Services as part of the Affordable Care Act (ACA). The number of dollars used for hospital readmissions has sky rocketed above $17 million for heart failure alone. The changes in the ACA reimbursement guidelines has put stress on many hospitals as they are facing reduced income, increased use of resources, and increased length of stay. This project evaluated the implementation of Project BOOST, its components, and their predictability for hospital readmission. Sample groups were evaluated both pre- and post-implementation of Project BOOST, which included individuals aged 18 and older, who were of Anglo, Hispanic or Native American descent, and living in Northern Arizona. A retrospective chart review was performed and descriptive and predictive statistics were used to analyze obtained data. Patients with cardiovascular disease admitted to the study hospital have high risks for readmission, such as problem medications, polypharmacy, psychological Issues, and principal diagnoses. Integrating elements from Project BOOST significantly decreased 30-day hospital readmissions. Data from this study revealed a statistically significant reduction in 30-day hospital readmission rates from 22% in the pre-intervention period to just 4% in the post-intervention period. Patients who did not receive the risk assessment tool were 14 times more likely to be readmitted to the hospital within 30 days of the index hospitalization.

Keywords: *Project BOOST, risk assessment, readmissions, heart failure, cardiovascular disease, Affordable Care Act*

CHAPTER 1

INTRODUCTION

Changes in health care financing due to the Affordable Care Act have resulted in decreased reimbursement payments to hospitals when patients are readmitted within a thirty-day period (Readmissions Reduction Program, n.d.). What this means for many hospitals is reduced income, increased use of resources (such as health care staffing and supplies) and, in some cases, increased length of stay. Hospital stakeholders across the country are looking for ways to reduce rehospitalizations and increase staff productivity in response to these challenges. Efforts are being made to combat rehospitalizations at Flagstaff Medical Center, located in Flagstaff Arizona. After researching existing programs to decrease hospital readmissions, the Society of Hospital Medicine's Project Better Outcomes for Older adults through Safe Transitions (BOOST) program was selected to be instituted at the Flagstaff Medical Center. The purpose of this Doctor of Nursing Practice (DNP) project was to describe risk factors for 30-day hospital readmission in patients with cardiovascular disease using the Project BOOST Risk Assessment (8P) screening tool and to compare hospital readmission rates between the pre- and post-BOOST intervention.

Project BOOST

Project BOOST, developed by the Society of Hospital Medicine (SHM), incorporates evidence-based interventions into the discharge process to help bridge the transition between hospital and home (Society of Hospital Medicine [SHM], 2008). Research has shown that during this transition, patients may not fill new prescriptions, attend their follow-up appointments or know when to ask for help (Coleman, 1990). Features of Project BOOST include reducing 30-

day readmission rates for general medical patients, improving patient and family education, and improving the flow of information between the hospital and outpatient providers (SHM, 2008). Using tools such as the Risk Assessment Tool at hospital admission stratifies the patient's risk of readmission within 30-days and likelihood of participating in their post-hospital care (SHM, 2008). Simply incorporating the BOOST toolkit has shown a marked decrease in the number of patient hospital readmissions (SHM, 2008). The planning and implementation portions of Project BOOST were well received by stakeholders at Flagstaff Medical Center. However, the data collection proved a difficult task for the primary investigator. Specifically, it was difficult to locate detailed documentation of the results from the Project BOOST assessment tools. Therefore, a central location for documentation of Project BOOST and pertinent admission and discharge information was created for the successful implementation of Project BOOST.

The risk assessment tool from the SHM consists of eight evidence-based areas (8Ps) that assist in defining the patient's level of risk for readmission (Appendix E). This assessment was completed for each patient upon admission from a computer-generated list of the previous day's admissions. Once risk areas were identified, a multidisciplinary team – comprised of a social worker, nurse, physical therapist, and physician – reviewed each patient's level of risk and formulated risk-specific interventions to reduce the 8P risk factors during hospitalization. For example, if a patient has a risk of readmission secondary to polypharmacy, the team would consider limiting the patient's home medication list to only necessary medications. Occasionally this is not possible and the patient remains on their original home medications. At this point, the patient is referred to a long-term care management program to be monitored by a social worker and registered nurse for follow-up care. If the patient is at risk due to poor health literacy,

teaching material is simplified and the patient receives simpler, more frequent education about their condition. The patient's level of risk is then documented in the Interdisciplinary Plan of Care (IPOC). The IPOC serves as a central location for documentation of the patient risk assessment, patient needs for transition to home, medication reconciliation, and follow-up appointments.

Background

Cardiovascular disease

Cardiovascular diseases include diagnoses such as myocardial infarction, coronary artery disease, cerebrovascular accident, and heart failure (HF). Patients with cardiovascular diseases are increasingly readmitted to the hospital, with the two most common diagnoses being HF and myocardial infarction (MI) (American Heart Association, 2013). HF alone is associated with costly readmissions and additional post-hospitalization care.

HF is a progressive disease in which the cardiac muscle is unable to pump enough blood to meet the body's needs (Yancy et al., 2013). In HF, the heart is in a weakened state caused by chronic illness, such as hypertension or dysrhythmia, which can lead to increased fatigue, shortness of breath and difficulty performing activities of daily living. According the AHA (2013), more than 5 million patients are currently diagnosed with HF in the United States and more than 500,000 patients are newly diagnosed each year. HF accounts for as many as 15 million doctor's office visits and 6 million hospital days each year (Yancy, et al., 2013).

A study conducted in 2009 revealed that 20% of Medicare beneficiaries with HF were readmitted to the hospital within thirty days of hospital discharge, costing an additional $17 million in healthcare (Jencks et al., 2009). All hospital readmission rates are under intense

scrutiny by the Centers for Medicare and Medicaid Services (CMS) since the passage of the Readmissions Reduction Program (CMS.gov, Readmissions Reduction Program, 2013; 42 CFR 412.152, n.d.) and are an important focus for quality of care and reimbursement from Medicare. According to the CMS, if a patient is admitted to an acute care facility with causes associated with a recent or prior admission, these days may be viewed as additional hospital days and may be deemed unnecessary hospital days by CMS. Additionally, private insurance and Medicare may reduce the amount of reimbursement to the acute care facility for premature discharge of the patient (Jencks et al., 2009). These additional hospital days add up in cost and potentially impose a financial burden on the patient and health care system. A 2009 study by Jencks et al. showed many rehospitalizations can be reduced or avoided altogether with supplemental education, teaching, and monitoring by a clinician (Jencks et al., 2009).

The Flinn Foundation Project

The Flinn Foundation Project entitled 'Precision Population Health Management: Integrated Paired Proposals for Personalized Transitional Medicine for Native American, Hispanic, and Anglo Populations in Northern Arizona' is a joint research project between Flagstaff Medical Center (FMC) and Northern Arizona University (NAU) to improve care for HF patients following hospitalization (NAU, 2014). The Executive Summary denotes the specific goals and objectives of the Flinn Foundation Project (Appendix D). The primary goal of this project is to create or improve evidence-based programs for transitional care in the home and the community by identifying factors that may affect the care process after patients are discharged from the hospital. Researchers from NAU and FMC hope to improve hospital programs for post discharge care in communities in Northern Arizona by providing culturally

competent, personalized, and effective care models for Native American, Hispanic, and Anglo populations, which are the largest populations in Northern Arizona (NAU, 2014).

The Flinn Foundation Project uses elements of Project BOOST to identify patients who are at high risk for 30-day hospital readmission. Eight patient factors that contribute to readmission risk, also known as "8P Patient Risk Assessment Tool," are a way to identify high risk patients at FMC. This risk assessment tool, along with other tools from project BOOST, demonstrated reduced 30-day readmissions in other institutions (Hansen, Greenwald, Budnitz, Howell, Halasyamani, Maynard, et al., 2013). The rates of readmission were across the board decreased when using the risk assessment tools from Project BOOST (Hansen et al., 2013). In a study using a multi-hospital sample group and the Project BOOST implementation tool kit, the absolute rate of 30-day readmissions was reduced by 2% (Hansen et al., 2013). This joint research venture has been approved by the Institutional Review Boards of both FMC and NAU. As a study team member on this project, the Principal Investigator (PI) was granted permission to use a portion of the data to perform a secondary analysis on participants within Project BOOST (Appendix E).

Purpose of the Project

The purposes of this Doctor of Nursing Practice (DNP) Project were: 1. to describe risk factors for 30-day hospital readmission in patients with cardiovascular disease using the Project BOOST Risk Assessment (8P) screening tool; and 2. to compare hospital readmission rates between the pre- and post-BOOST intervention.

CHAPTER 2

LITERATURE REVIEW

Several literature databases were explored to gain information about hospital readmissions, transitional care, chronic disease management, and interdisciplinary care. The databases searched include Cumulative Index to Nursing and Allied Health Literature (CINAHL), PubMed, and Google Scholar. The search terms used were hospital readmission, transitional care, interdisciplinary care, project BOOST, and preventing readmission.

Hospital readmission has been of investigative interest since the mid-1990s. The period immediately following a patient's discharge is when the patient is most vulnerable and most likely to be readmitted to the hospital (Brooten, Naylor, Brown, York, Hollingsworth, Cohen, Roncoli, and Jacobsen, 1996). It is during this time when patients require close monitoring and follow up to answer additional patient questions, provide guidance, and ensure provider follow up. A retrospective study performed by Moore, McGinn, and Halm (2007) showed that approximately 35.9% of patients did not follow through with recommendations from their hospital discharge plan.

Two important researchers on Transitions of Care are Eric Coleman and Mary Naylor. Individually, each has devoted years of research to the topic of care transitions of the elder population. Together, they provide the basis of what we know about transitional care and hospital readmission risk. Naylor and Coleman were involved with the Society of Medicine's Project BOOST from the beginning, providing expert guidance on best practice. Each has stated in prior research that the most vulnerable time for hospital readmission is the first four weeks after discharge and the care patients receive after discharge is often fragmented (Coleman, 2003

and Naylor, 1990). With this knowledge, it is important to identify those patients prior to discharge who may have difficulty with filling medications and making follow up appointments.

Mary Naylor, PhD, RN has been a champion of transitional care since 1989. As a nurse researcher, she developed the Transitional Care Model in which the Advanced Practice Nurse plays an integral part in providing continued care to patients between hospital and home (Naylor, 2000). Her work in transitional care has put a national spotlight on the fragmented care patients receive once they are discharged from the hospital. Her research team is providing a health care improvement and policy change that are essential for sustaining quality care.

Eric Coleman, MD, MPH has been researching care transitions since the early 2000s. He developed the Care Transitions Intervention which focuses on decreasing hospital readmissions during the first four weeks following discharge by teaching the patient self-care and providing a transitions coach to guide patients through the transition period (Coleman, n.d.).

Significance to Clinical Practice

Implementing measures known to prevent hospital readmission is essential in the provision of quality of care which also addresses rising healthcare costs. Supporting patients with HF through care transitions has been identified as a way to avoid hospital readmissions (Coleman, 2003; Naylor, 1990). Avoiding hospital readmission is addressed in the 2013 HF guideline for care coordination (Yancy et al., 2013). The SHM and Project BOOST provide the guidance and tools needed to educate the patient and monitor care transitions from hospital discharge to home.

The purpose of this DNP project is to identify common risk factors for hospital readmission of patients with cardiovascular disease within Northern Arizona. This project will

also be used to determine if using the 8P Risk Assessment Tool and risk-specific interventions together have any bearing on reducing hospital readmission at FMC.

CHAPTER 3

METHODS

Specific Aims

The specific aims of this DNP Project are to:

Specific Aim 1. Describe risk factors for 30-day hospital readmission in patients with cardiovascular disease using the eight P Risk Assessment screening tool from the Project BOOST.

Specific Aim 2. Compare hospital readmission rates between the pre- and post-BOOST intervention.

Research Design

A descriptive comparative study design was used to describe risks for hospital readmission using the 8P risk assessment tool and to compare hospital readmission rates between patients admitted in the pre- and post-BOOST implementation periods. A time frame of three months before and after Project BOOST implementation was used.

Setting

The setting for this project was Flagstaff Medical Center, level I regional trauma center, located in northern Arizona. This 267-bed regional referral center services all of northern Arizona, from southern Utah to northern Yavapai County and from the California/Arizona border to the Arizona/New Mexico border. More than 200,000 patients are seen at Flagstaff Medical Center annually.

Study Sample

The sample for this project included both men and women who are 18 years of age and older. The participants were residents of northern Arizona living in specific geographical locations, which included Flagstaff, Kachina Village, Mountainaire, Bellemont, Parks, Williams, Munds Park and Winslow. The study sample included patients with diagnoses that are cardiac in nature, specifically HF and/or acute myocardial infarction (AMI) as primary or secondary diagnoses, HF exacerbation, and CAD with stent procedure. In 2014, over one thousand patients with a principal diagnosis of HF or HF as a comorbidity were cared for at the Flagstaff Medical Center (MIDAS, 2014). Exclusion criteria included participants younger than 18 years of age, residence on the Navajo Nation, and CAD without stenting.

Instruments

Interdisciplinary Plan of Care

The Flagstaff Medical Center Department of Care Coordination developed the Readmission Prevention Interdisciplinary Plan of Care (IPOC) as a central location for documentation of patient discharge needs. These include whether a patient needs outpatient therapies, home oxygen, any follow up appointments or medication prescriptions. Figure 1 represents the IPOC as part of the patient's chart. The 'Outcomes' section at the top includes standard readmission and discharge requirements for all patients. The 'Interventions' section at the bottom includes the patient's specific risks using the 8P Risk Assessment Tool.

Outcomes				
	Readmission Risks Addressed	Activated	By Phase End	✓ 1/29/2015 21:25
	Outpatient Care Need - Anticipated	Activated	1/20/2015 7:39 - Phase End	✓ 1/29/2015 11:18
	Outpatient Skilled Services Post DC	Activated	1/20/2015 7:39 - Phase End	✓ 1/29/2015 11:18
	DME Deliver to	Activated	1/20/2015 7:39 - Phase End	
	Discharge To - Anticipated	Activated	1/20/2015 7:39 - Phase End	✗ 1/29/2015 11:18
	Needs Assistance with Transportation	Activated	1/20/2015 7:39 - Phase End	✓ 1/29/2015 11:18
	Verbalize Understanding of Readmission Prevention	Activated	By Phase End	✓ 1/29/2015 21:25
	Barriers to Discharge Identified	Activated	1/20/2015 7:39 - Phase End	✗ 1/29/2015 11:18
	Advance Directive	Activated	1/20/2015 7:39 - Phase End	
	D/c Plan Discussed	Activated	1/20/2015 7:39 - Phase End	✓ 1/29/2015 11:18
	Home Health Arranged	Activated	1/20/2015 7:39 - Phase End	
	Readmission Documentation Completed	Activated	By Phase End	✓ 1/29/2015 21:25
	Readmission Transition Doc Complete	Activated	1/20/2015 7:39 - Phase End	
	Pharmacy Education Completed			
	Education Topics RX	Activated	1/20/2015 7:39 - Phase End	
	Dietitian Education Completed			
	Topics	Activated	1/20/2015 7:39 - Phase End	
	Physical Therapy Education Completed			
	Topics	Activated	1/20/2015 7:39 - Phase End	
	Occupational Therapy Education Completed			
	Topics	Activated	1/20/2015 7:39 - Phase End	
Interventions				
	EDUCATION			
	Involve Significant Support Person	Activated	1/20/2015 7:39 - Phase End	✓ 1/29/2015 21:25
	POLYPHARMACY			
	Polypharmacy is 8 or more scheduled prescription medications			
	Assess Home Medication Routine	Activated	1/20/2015 7:39 - Phase End	✓ 1/29/2015 21:25
	Screen Patient/Family for Medication Adherence	Activated	1/20/2015 7:39 - Phase End	✓ 1/29/2015 21:25

Figure 1. An Example of the Readmission Prevention Interdisciplinary Plan of Care (Cerner Corporation, 2011).

Project BOOST 8P Risk Assessment Tool

The 8P Risk Assessment Tool was used to identify areas of potential risks for readmission for each patient after they were discharged to home. Our hypothesis was if these areas of potential risk were addressed prior to hospital discharge, the likelihood of the patient readmitted within 30-days decreases. The 8P Risk Assessment Tool contains eight areas of risk that should be addressed for all hospitalized patients (Risk Assessment, 2014).

Problem medications/**P**olypharmacy is defined as taking more than 10 routine medications or on high-risk medications. As described by the SHM, high-risk medications (SHM, 2015) are anticoagulants (e.g. warfarin, heparin, Factor Xa or thrombin inhibitors), antiplatelet agents used in combination (e.g. aspirin and clopidogrel), insulin, oral hypoglycemic agents, digoxin, and narcotics. Polypharmacy is often defined as being prescribed more than five medications, but can

be upwards of 7-9 medications (Liu, 2014). Patients prescribed more than five medications have an 82% higher risk for adverse effects (Lui, 2014).

Psychiatric complications were defined as when the patient has cognitive impairment or recent behavioral health hospitalization within the past month. Diagnoses considered for cognitive impairment included any type of acute confusional state or encephalopathy. In addition, Patient Health Questionnaire-9 (PHQ-9) was used by Project BOOST to measure depressive symptoms on all in patients (Appendix G). PHQ-9 demonstrated satisfactory internal consistency with a Cronbach alpha of 0.82 in patients with cardiovascular disease. The construct validity of PHQ-9 was supported by high correlations with the Living with Heart Failure Questionnaire in HF patients (Presser et al., 2011).

Principal diagnoses considered high risks for hospital readmission included HF, acute myocardial infarction, chronic obstructive pulmonary disease, pneumonia, total hip arthroplasty/total knee arthroplasty, diabetes mellitus, end stage renal disease, chronic pain, and organ transplant. Two or more complex medical conditions or one new principal diagnosis obtained from patient history upon admission were also found to put the patient at higher risk for hospital readmission.

Physical functional status was evaluated by a physical therapist during each hospital admission. Physical therapists evaluated each patient identified as a potential Project BOOST participant. These patients were evaluated for functional status and ability to perform activities of daily living. If a patient was unable to perform activities of daily living, mobility by self, or had multiple falls in the previous 3 months, these deficits were documented and used to determine long term placement after hospital discharge.

Poor health literacy was defined as an unfamiliarity with or inability to understand medical instruction, low hearing or vision, or language barrier. The Rapid Estimate of Adult Literacy in Medicine (REALM), a commonly used word recognition test in the medical setting (Appendix H), was used to evaluate health literacy, and to modify patient teaching throughout the hospital stay. REALM uses common medical terms or layman's terms for body parts and illness (Davis, Michielutte, Askov, Williams, and Weiss, 1998) to categorize a patient as a poor, midrange, or high-level reader. The validity of this instrument is high with a test-retest and reliability of 0.97 ($p < .001$) (Davis et al., 1998). The REALM takes a short amount of time to administer and score.

Patient support challenges were defined as when the patient lives alone with no family or community support, or homeless. As part of discharge planning process, the General Assessment of Preparedness (GAP) was used to determine patient readiness and success for transition to home (Appendix F). GAP considers the level of service the patient requires and what support is available at home. Performing a bedside screening tool, such as the GAP, can quickly identify patients who may be at higher risk for rehospitalization (Manning, 2011). The recommended intervention for those that are at a higher risk for readmission is increased teaching time for the patient and their family/caregivers.

Prior hospitalization is a risk for future rehospitalization. If there was more than one hospitalization or multiple emergency department visit within the previous 30-days, it indicates an increased risk for rehospitalization.

Palliative care is defined by the World Health Organization (2014) as an approach that improves the quality of life of patients facing the problem associated with life-threatening illness,

through the prevention and relief of suffering by means of early identification and impeccable assessment and treatment of pain and other problems, physical, psychosocial and spiritual. The patient's hospital physician helped determine if the patient had any chronic or progressive life limiting condition then recommend the patient for palliative care consultation.

Each identified risk triggered an alert for the multidisciplinary team to evaluate and address individual need of the patient. There was a process to document these interventions as well as the patient discharge from hospital to home (Risk Assessment, 2014).

Intervention related to 8P Risk Assessment Tool

The intervention for **P**roblem medications/**P**olypharmacy was taken on by a pharmacist and physician to determine what medications were necessary and what could be eliminated. **P**sychiatric complications can be paralyzing for a patient when they are not receiving appropriate care. If a patient was found to have psychiatric risk for readmission, they were evaluated by the behavioral health intake representative and referred for further psychiatric care.

Patients who presented with two or more complex medical conditions were flagged as having the risk factor **P**rincipal diagnoses. Having these diagnoses documented throughout the patient chart allowed the patient to be followed more closely by the social worker and help the patient get connected services when they were ready to be discharged from the hospital.

Each patient was evaluated by a physical therapist who then determined the patient's **p**hysical functional status. These patients were evaluated for functional status and ability to perform activities of daily living. If a patient was unable to perform activities of daily living, mobility of self, or had multiple falls in the previous 3 months, recommendations were made for

rehabilitation in a skilled nursing facility, additional treatment in the outpatient setting, or at home with home health.

Poor health literacy was defined as an unfamiliarity with or inability to understand medical instruction, low hearing and vision, or language barrier. Using the Rapid Estimate of Adult Literacy in Medicine (REALM), the health care team was able to quickly categorize patients as a poor, midrange, or high-level reader. This information was used to modify teaching and frequency of teaching throughout the hospital stay.

Patient support was a high predictor for 30-day hospital readmission. Patient support challenges are defined as a patient who lives alone with no family or community support, or is homeless. Evaluation of this risk factor helped to identify what type of support system the patient had when leaving the hospital. The recommended intervention by SHM (2015) for those at higher risk for readmission was increased teaching time for the patient and their family/caregivers and identified community services that were available to help the patient during their transition; for example, Meals-on-Wheels and transportation to/from appointments.

Prior hospitalization did not show high predictability for readmission in this study. The intervention for this risk factor was to identify the chief complaints of the previous admissions then look closely at length of stay and discharge data. Data on length of stay and specific discharge data was not immediately available for this project. This detailed information may provide a clearer picture of premature discharge.

Palliative care was not a significant predictor of hospital readmission for this study. Appropriate interventions for palliative care within FMC were to ask the Palliative Care team to consult on the case allowing for pain management, comfort care, or end of life care. Of the pre-

intervention patients, 25 patients (21.7%) were readmitted, including all-cause, within 30 days of discharge from the hospital.

Data Collection and Management

After receiving human subject protection approval from the University of Arizona, the principal investigator received a list of patients meeting inclusion criteria from the Flinn Foundation Project. This list was used to access the electronic health record subject via a secure access using an assigned user name and password. An Excel (Microsoft, USA) spreadsheet was used to organize and capture variables as they were extracted from each patient's chart. Demographic data including age, gender, ethnicity, and race were obtained. Clinical variables collected were left ventricular ejection fraction (EF), admitting diagnoses, a P-index variable which is the sum of number of BOOST risk factors, co-morbidities, and whether or not the patient was readmitted within thirty days after the index hospital discharge.

Data in Excel spreadsheet were transferred into SPSS, Statistical Package for the Social Sciences (IBM SPSS, version 23, 2015) for analysis. Once the data were uploaded, the PI verified the accuracy and completeness of each entry for errors that may have occurred during data transfer. Descriptive statistics were used to describe the demographic variables, as well as chi-square to evaluate between-group significance. A series of single variate analysis using binary logistic regression was completed to examine the effect of demographic and clinical data, such as sex, age, and race, diagnosis, EF, and the 8P risk assessment on 30-day hospital readmissions. A p value of less than 0.05 was considered statistically significant.

Human Subject Protection

As a study team member on the Flinn Foundation Project, 'Precision Population Health Management: Integrated Paired Proposals for Personalized Transitional Medicine for Native American, Hispanic, and Anglo Populations in Northern Arizona', I was granted special permission to perform a secondary analysis using Project BOOST data that were extracted with the initial purpose of providing personalized transitional medicine. A letter of support from the principal investigators accompanies this project in Appendix A. An addendum was filed and approved by both the Institutional Review Board of Flagstaff Medical Center and Northern Arizona University adding my name as a study team member to the Flinn Foundation Project (Appendix C). This joint research project was approved by the Institutional Review Boards of both FMC and NAU. Approval from the University of Arizona Institutional Review Board was received prior to the collection of data (Appendix B). This DNP Project involved retrospective chart reviews and all information obtained was treated in a confidential and anonymous fashion.

CHAPTER 4

RESULTS

Sample Characteristics

Sample

Of the 114 patients in the pre-BOOST period, 73 (64%) were men. The majority of these patients (n=81; 70.4%) were older than age 60, with a mean age of 67.93 ± 12.95 years, ranging 39-92 years. The racial/ethnic composition was Anglo (n=75; 65.8%), Native American (n=37; 32.5%), Hispanic (n=18; 15.8%), and Asian (n=2; 1.8%). Among the 93 patients included during the post-BOOST period, 56 (60.2%) were men. The majority of these patients were older than age 60 (n=67, 72%) with an age range of 34-96 (mean age: 67.83 ± 14.28 years). Approximately 69 (74.2%) of patients were Anglo, while 24 (25%) were Native American and 15 (16.1%) identified as Hispanics. There were no statistically significant differences in the demographic characteristics between the two samples (See Table 1).

Table 1. Patient Demographic Characteristics for the Pre-and Post-BOOST Samples.

	Pre-Boost		Post-Boost		Chi-Square Test
	N	%	N	%	
Biological Sex					
Female	41	36	37	39.8	
Male	73	64	56	60.2	ns
Race					
Anglo	75	65.8	69	74.2	
Native American	37	32.5	24	25.8	
Asian	2	1.8			ns
Ethnicity					
Non-Hispanic	96	84.2	78	83.9	
Hispanic	18	15.8	15	16.1	ns
Caregiver presence					
Lives Alone	22	19.3	13	14	
No Caregiver	16	14	10	10.8	
Homeless	2	1.8			ns
	M	SD	M	SD	t-test
Age	67.93	±12.95	67.83	±14.28	ns

Clinical Characteristics of the Sample

There were statistically significant differences in clinical characteristics between patients in the pre- and post-BOOST periods; specifically related to CAD, HF, cognitive impairment, and depression (using the PHQ-9) (See Table 2). Patients in the post-BOOST group had significantly higher percentage of CAD (74%) than did the pre-BOOST group (47.4%, $X^2_{(1, n = 207)} = 15.29$, $p < .001$). Moreover, there was a higher frequency of cognitive impairment (16% vs. 7.9%, $X^2_{(1, n=207)} = 4.18$, $p < .05$) and depression (64.8% vs. 9.6%, $X^2_{(1, n=207)} = 68.54$, $p < .001$, respectively) in the post-BOOST group than in the pre-BOOST group. All subsequent analyses included CAD, HF, cognitive impairment, and depression in order to make proper comparisons between the pre- and post-BOOST groups.

Table 2. Patient Medical Characteristics for the Pre and Post BOOST Samples.

	Pre-Boost N	%	Post-Boost N	%	Chi-Square Test χ^2
Acute MI					
No	72	63.2	61	65.6	
Yes, STEMI	34	29.8	24	25.8	
Yes, NSTEMI	6	5.3	8	8.6	
Yes, Acute MI	2	1.8			ns
HTN					
No	79	69.3	55	59.1	
Yes	35	30.7	38	40.9	ns
CAD					
No	60	52.6	24	25.8	
Yes	54	47.4	69	74.2	15.29***
Heart Failure					
No	47	41.2	51	55.4	
Yes	67	58.8	41	44.6	4.12*
Dysrhythmias					
No	87	76.3	75	80.6	
Yes	27	23.7	18	19.4	ns
More than 5 medications					
No	40	35.1	35	37.6	
Yes	75	4.9	58	62.4	ns
Anticoagulant					
No	76	66.7	49	53.8	
Yes	38	33.3	42	46.2	ns
Antiplatelet					
No	33	28.9	30	33	
Yes	81	71.1	61	67	ns
Insulin					
No	78	68.4	69	75.8	
Yes	36	31.6	22	24.2	ns
Oral hypoglycemic agent					
No	93	81.6	69	75.8	
Yes	21	18.4	22	4.2	ns
Digoxin					
No	109	95.6	81	89	
Yes	5	4.4	10	11	ns
Narcotics					
No	77	67.5	55	60.4	
Yes	37	32.5	36	39.6	ns

Co-morbidities					
None	37	32.5	41	45.1	
One	49	43	33	36.3	
Two	21	18.4	15	16.5	
Three	7	6.1	2	2.2	ns
Cognitive Impairment					
No	105	92.1	77	82.8	
Yes	9	7.9	16	17.2	4.18*
Depressed (PHQ9)					
No	103	90.4	32	35.2	
Yes	11	9.6	59	64.8	68.54***
Dx Depression					
No	100	87.7	75	82.4	
Yes	14	12.3	16	17.6	ns
Readmitted in 30 days					
No	89	78.1	89	95.7	
Yes	25	21.9	4	4.3	13.21***

ns =not significant, *p<.05, **p<.01, ***p<.001

8P Risk Factors

Of the 114 patients in the pre-BOOST period, 22 (19.3%) had 2 of the 8P risk factors, while 32 (8.1%) had 3 of the 8P risk factors, 23 (20.2%) had 1 of the 8P risk factors, 22 (19.3%) had 4 of the 8P risk factors, and 14 (12.2%) had five or more 8P risk factors (see Figure 2). Of the 93 patients in the post-BOOST period, 28 (30.1%) had 3 of 8P risk factors, while 16 (17.2%) had 2 of 8P risk factors, and 40 (43%) had 4 or more of 8P risk factors. Operationalizing the 8Ps into a summed index, there was a significant difference between the two groups. The pre-BOOST group (M=2.84, SD=1.37) had, on average, significantly fewer of the risk factors than did the post-BOOST group (M=3.22, SD=1.24, $t_{(207)} = 2.03$, $p < 0.05$) (See Table 3).

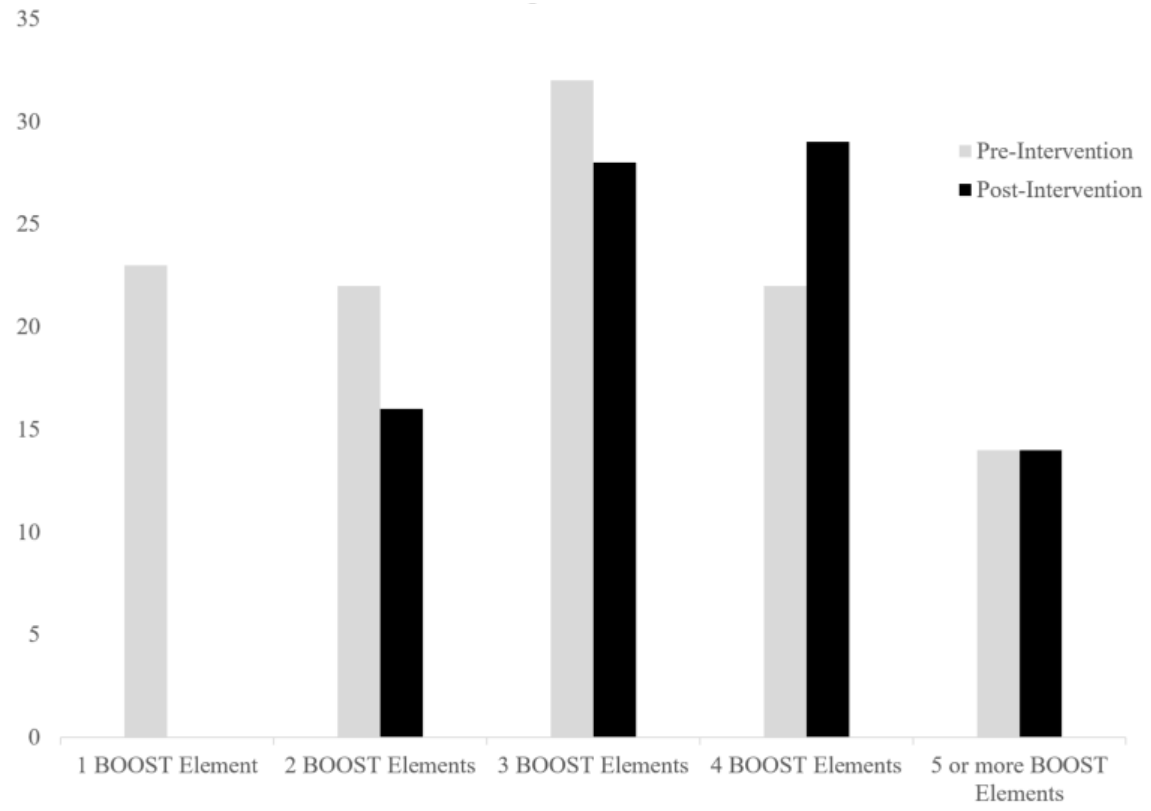

Figure 2. Comparison Analysis of Summed 8P Risk Factors in both Pre- and Post-Intervention Groups.

There was also a statistically significant difference on psychological issues as a risk factor between the pre-BOOST and post-BOOST groups (21.9% vs 72.5%, respectively, $X^2_{(1, n=207)} = 52.48$, $p < .001$).

Table 3. 8P Characteristics for the Pre- and Post-BOOST Periods.

	Pre-Boost		Post-Boost		Chi Square Tests
Problem Medications					
No	11	9.6	10	11	ns
Yes	103	90.4	81	89	
Polypharmacy					
No	40	35.1	35	37.6	ns
Yes	74	64.9	58	62.4	
Psychological					
No	89	78.1	25	27.5	52.48***
Yes	25	21.9	66	72.5	
Prior Hospitalization					
No	97	85.1	74	81.3	ns
Yes	17	14.9	17	18.7	
Principal Diagnosis					
No	37	32.5	41	45.1	ns
Yes	77	67.5	50	54.9	
Poor Health Literacy					
No	12	80	55	85.9	
Yes	3	20	9	14.1	ns
Palliative Care					
No	103	90.4	87	93.5	
Yes	11	9.6	6	6.5	ns
Patient Support					
No	89	78.1	80	86	
Yes	25	21.9	13	14	ns
P or Risk Index	2.84	1.37	3.22	1.24	2.03*

ns =not significant, *p<.05, **p<.01, ***p<.001

BOOST Intervention and Hospital Readmission

There was a statistically significant difference in hospital readmission rate between the pre-BOOST (n=25, 21.9%) and post-BOOST groups (n = 4, 4.3%, $X^2_{(1, n=207)} = 13.21$, $p < .001$). It is important to note that with only 4 readmissions in the post-BOOST time period, it may be difficult to fit a stable model or precise estimates. As seen in table 4, the number of patients who

were readmitted and did not receive the intervention was significantly higher than the number of patients who were readmitted and did receive the intervention.

Table 4. Intervention and Readmission for the Pre and Post BOOST Period (n=207).

	Pre-Boost		Post-Boost		Chi Square Tests
Intervention Received					
No	99	86.8	29	31.2	
Yes	15	13.2	64	68.8	67.24***
Readmitted w/Intervention received					
No	21	84	1	25	ns
Yes	4	16	3	75	ns

ns =not significant, *p<.05, **p<.01, ***p<.001

Hospital Readmission

Having established that the pre-BOOST and post-BOOST groups are somewhat comparable in characteristics and that all analyses comparing them need to also control for CAD, HF, cognitive impairment, and psychological issues, a series of bivariate and a multivariate logistic regression models were fitted to the of hospital readmission data.

Bivariate Analyses

A series of single predictor logistic regression models were fitted to the data to examine hospital readmission as a function of a) demographic characteristics; b) medical characteristics; c) P risk factors, both individually and as a summed index; and d) post-BOOST period. As is presented in Table 5, men were two and a half times more likely to be readmitted than were women (OR=2.60, CI=1.01-6.71). Furthermore, individuals who had a caregiver present were just as likely to be readmitted as those who lived alone (OR=.848, CI=.632-1.14). As noted earlier, there was a statistically significant difference in hospital readmission between the pre-

BOOST (n=25, 21.9%) and post-BOOST groups (n = 4, 4.3%, $X^2_{(1, n=207)} = 13.21$, $p < .001$), with our caution about the stability of a logistic regression model with only 4 readmissions.

Table 5. Bivariate Logistic Regression Examining the Relationships Between Demographic Characteristics, Medical Characteristics, and Risk Factors and Hospital Readmission (n = 207)

Variables	Hospital readmission		
Demographic Characteristics	**β**	***SE***	***OR* (95% CI)**
Male (female referent)	.957*	.483	2.60 (1.01-6.71)
Age	.003	.015	1.00 (.97-1.03)
Race (Anglo referent)	.149	.403	1.16 (.53-.22.56)
Ethnicity (Non-Hispanic referent)	.378	.504	1.46 (.54-3.92)
Caregiver presence	-.166	.149	.848 (.632-1.14)
Medical Characteristics			
CAD (none referent)	-.526	.402	.591 (.27-1.30)
Heart Failure	-.491*	.198	.612 (.42-.90)
Cognitive Impairment	-.1.99**	.615	.136 (.04-.46)
Depression using PHQ-9	-2.37***	.427	.094 (.04-.22)
8P Risk Factors			
Polypharmacy	-.288	.960	.750 (.11-4.92)
Problem Medications	.137	1.42	1.15 (.07-18.58)
Principal Diagnosis	.857	1.05	2.36 (.30-18.43)
Psychological Issues	1.56	1.01	4.76 (.66-34.47)
Poor Health Literacy	.276	1.27	.1.32 (.11-15.95)
Patient Support	1.12	1.17	3.07 (.31-30.09)
Prior Hospitalization	-1.74	.958	.175 (.03-1.14)
Palliative Care	-3.42*	1.38	.033 (.002-.49)
8P Summed Index			
P Index Variable	-.534***	.067	.586 (.51-.67)
Post-Boost Period	-2.33***	.396	.097 (.05-.21)

Note: *p < .05, **p < .01, ***p<.001

Clinical characteristics which were significant predictors of readmission were a) HF, b) cognitive impairment, and c) depression. Individuals without HF were half as likely to be readmitted as those with HF (OR=.612, CI=.42-.90). Individuals with cognitive impairment were also just as likely to be readmitted as those without cognitive impairment (OR=.136, CI=.04-

.46). Individuals who exhibited depression were also just as likely to be readmitted as were those who did not exhibit depression (OR=.094, CI=.04-.22).

Individually, the 8P risk factor which showed statistical significance was palliative care. Individuals who received palliative care while in the hospital were just as likely to be readmitted to the hospital as those who did not receive palliative care (OR=.033, CI=.002-.49). As a summed index, the p-index variable did show significant difference in that those who had a lower number of risk factors were half as likely to be readmitted than those who had a higher number of risk factors. Additionally, those who received the intervention were nearly a tenth as likely to be readmitted as those who did not receive the intervention (OR=.097, CI=.05-.21).

Multivariate Analyses

A series of logistic regression models were fitted to the data to examine hospital readmission before and after the Project BOOST intervention (See Table 6). Model 1 examined differences in hospital readmission by demographic characteristics. Of these characteristics, gender and caregiver presence were significant predictors. Men were three times more likely to be readmitted than were women (OR = 3.08, 95% CI=1.15-8.24). Individuals without a caretaker at home were three times more likely to be readmitted than those who had a caretaker at home (OR=3.29, 95% CI=1.25-8.61).

Model 2 examined differences in hospital readmission by medical characteristics. Individuals with CAD did not remain a significant predictor in this model (OR = 1.03, 95% CI=.61-1.74). Additionally, individuals who were admitted with HF were about a tenth as likely to be readmitted than those who did not have a HF diagnosis (OR =.199, 95% CI=.11-.37).

Individuals who were admitted with depression were nearly fourteen times more likely to be readmitted than those who were not depressed (OR = 13.67, 95% CI=6.01-31.10).

Model 3 examined the individual factors of the 8P Risk Assessment tool. Of these eight factors, individuals who had one or more problem medications listed on their medication list were four and a half times more likely to be readmitted than those without any problem medications (OR = 4.65, 95% CI=1.03-20.93).

Model 4 examined the differences in hospital readmission by time cohort (pre- versus post-BOOST). There was a statistically significant difference in readmissions such that individuals in the post-BOOST period were only a tenth as likely to be readmitted than individuals in the pre-BOOST period (OR = 14.57, 95% CI=7.25-29.28).

Model 5 included 1) those characteristics which were significantly different between the pre- and the post-BOOST patient groups: gender, caregiver presence, CAD, and BOOST period; and 2) the significant predictors of hospital readmission from the preceding models. In this final model, men remained 23% less likely to be readmitted than were women (OR=.230, 95% CI=.08-.63). Caregiver presence also remained a significant predictor for readmission with individuals who did not have a care giver present were 23% less likely to be readmitted as were individuals who did have a care giver present (OR=.233, 95% CI=.10-.54). The four main medical characteristics that are included in the model were not significant predictors of readmission, nor was the P risk factor, Problem Medications. BOOST period also did not remain a significant predictor for readmission.

In looking at the results of Model 5, the population getting readmitted were men who did not have a caregiver present. Individuals who received the BOOST risk assessment tool were just

as likely to be readmitted to the hospital as were those who did not receive the risk assessment tool.

Additional Analyses: Intervention Implementation

It is well known that the implementation of new protocols is a change requiring time. During the pre-BOOST period, 13% actually received the intervention and during the post-BOOST period, 68% actually received the intervention. Alternate analyses were conducted to examine the effect of the intervention itself, separate from the two time periods. Descriptive analyses of the new samples indicated that neither the demographic characteristics nor the medical characteristics of the patients were different from the primary analyses. The group that received the intervention did have a significantly higher number of CAD diagnoses (56.3%, $X^2_{(1, n = 207)} = 14.09$, $p < .001$), as well as use of an anticoagulant (53.5%, $X^2_{(1, n = 207)} = 4.00$, $p < .05$), and digoxin than the group that did not receive the intervention (76.9%, $X^2_{(1, n = 207)} = 6.02$, $p < .05$).

A series of logistic regression models were fitted to the alternate data. This alternate data analysis was used to determine any differences between groups of individuals both pre and post BOOST periods. Model 1 examined the demographic data which revealed no statistical significant difference in gender, age, race, ethnicity, or caregiver presence. This was different from the original model.

Model 2 examined the medical characteristics which revealed a significant statistical difference in individuals on 5 or more medications (OR=.42, CI=.24-.71). Individuals who were on 5 or more medications were 42% less likely to be readmitted than an individual who is on less than 5 medications.

Model 3 looked at the 8P risk factors. This model demonstrated a significant statistical difference in psychological issues (OR=.14, CI=.02-1.07). Individuals with the risk factor of psychological issues is 14% less likely to be readmitted than individuals without this risk factor. This model was also similar to the original model.

Model 4 looked at whether individuals were screened as part of the intervention program. A significant statistical difference was seen (OR=.10, CI=.05-.21). Individuals who were screened as part of the BOOST period were only 10% as likely to be readmitted than those who were not screened as part of the BOOST period.

The final model, model 5, included the characteristics which were significantly different between the pre- and the post-BOOST patient groups: gender, age, dysrhythmias, 8P risk factors, and BOOST period. Only individuals on more than 5 medications and individuals who received palliative care were significant predictors of hospital readmission. This final model was similar to the original model (See Table 7).

Summary

In conclusion, the comparison between pre-intervention and post-intervention groups revealed a small yet statistically significant difference in rate of readmission. With a small number of patients who were readmitted in the post-intervention group, the final logistic regression model was not a stable fit. The alternate analyses run looking at the intervention showed statistics much like those from the original analyses. Looking at the entire data set, one can tell this project was part of a new protocol implementation, where use of the implement slowly gains momentum. This period of “ramping-up” is expected in any intervention

implementation as evidenced by the increasing number of individuals who received the intervention by the end of the study period.

Table 6. Logistic Regression Modeling of Hospital Readmission in 30 Days and the 8P Risk Assessment Tool.

	Model 1		Model 2		Model 3		Model 4		Model 5	
	AOR	95%CI	AOR	95%CI	AOR	95%CI	AOR	95%CI	AOR	95%CI
Demographic Characteristics										
Male	**3.08***	**1.15-8.24**							**.230****	**.08-.63**
Race	1.93	.78-4.73								
Ethnicity	1.81	.61-5.39								
Age	1.01	.98-1.04								
Caregiver presence	**3.29***	**1.25-8.61**							**.233*****	**.10-.54**
Medical Characteristics										
CAD			1.03	.61-1.74					1.29	.56-2.99
Heart Failure			**.199*****	**.11-.37**					.834	.36-1.91
Cognitive Impairment			1.92	.65-5.70					.468	.20-1.12
Depressed (PHQ9)			**13.67***	**6.01-31.10**					1.43	.49-4.13
8P Risk Factors										
Polypharmacy					1.21	.361-4.04				
Problem Medications					**4.65***	**1.03-20.93**			.661	.16-2.68
Principal Diagnosis					.420	.093-1.89				
Psychological Issues					2.31	.677-7.88				
Poor Health Literacy					1.08	.226-5.13				
Patient Support					.641	.162-2.54				
Prior Hospitalization					.990	.222-4.41				
Palliative Care					.516	.038-7.08				
BOOST Period										
Yes							**14.57*****	**7.25-29.28**	1.45	.51-4.13

Note: *$p < .05$, **$p < .01$, ***p<.001

Table 7. Alternate Analysis of Logistic Regression Modeling of Hospital Readmission in 30 Days and the 8P Risk Assessment Tool

	Model 1		Model 2		Model 3		Model 4		Model 5	
	AOR	95%CI	AOR	95%CI	AOR	95%CI	AOR	95%CI	AOR	95%CI
Demographic Characteristics										
Gender	1.22	.70-2.14								
Race	.591	.32-1.11								
Ethnicity	.639	.29-1.43								
Age	.994	.99-1.00								
Caregiver presence	1.10	.52-2.30								
Medical Characteristics										
CAD			1.59	.97-2.61						
Heart Failure			.96	.57-1.63						
Dysrhythmias			1.19	.60-2.36						
>5 medications			**.42***	**.24-.71**					**.663***	**.46-.96**
8 Ps Risk Factors										
Problem Medications					1.15	.07-18.58				
Polypharmacy					.750	.11-4.92				
Psychological					4.76	.66-34.47				
Prior Hospitalization					.175	.03-1.14				
Principal Diagnosis					2.36	.30-18.43				
Poor Health Literacy					1.32	.11-15.95				
Palliative Care					**.03***	**.002-.49**			.326	.09-1.17
Patient Support					3.07	.31-30.09				
Readmitted in 30 days										
Yes							**.318****	**.14-.75**	.457	.19-1.11

Note: *$p < .05$, **$p < .01$ ***p<.001

CHAPTER 5

DISCUSSION

Using the 8P Risk Assessment Tool, data from this DNP project showed many of the patients with cardiovascular disease admitted to the study hospital have high risks of problem medications, polypharmacy, psychological issues, and principal diagnoses for hospital re-admission. Identification of these hospital readmission risks allow for interdisciplinary interventions. Such integrated effort of using the 8P Risk Assessment Tool and related interventions significantly decreased 30-day hospital readmissions for patients with cardiovascular diagnoses in the study hospital.

Combining the pre- and post-BOOST periods, the risk factor most significant for 30-day hospital readmission was psychological issues. Psychological issues included patients with depression, cognitive impairment including any type of confusional state, and prior behavioral health hospitalization within the month prior to the index hospitalization. The PHQ-9 was used to identify patients with depressive symptoms. The results of the PHQ-9 allowed the provider to make further recommendations in their care which included evaluation from a mental health expert or medicinal management. Identification of depression and interventions implemented for depression may have contributed to the improvement of hospital readmission found in this study.

Demographic data analysis revealed that men were more likely to be readmitted to the hospital than were women. Furthermore, patients who had a caregiver available were 23% less likely to be readmitted to the hospital as were patients without a caregiver available. This information supports the hypothesis that having a caregiver present increases the likelihood that

the patient will follow through with post-hospitalization instructions. Epstein-Lubow et al (2014) also stated that the presence of a caregiver is associated with greater patient participation.

It was found that documentation of the risk assessment tool was inconsistent throughout the pre-intervention period. This may account for the increase in patients with psychological issues in the post-intervention period. When new protocols are implemented, there is a ramping up period that is expected which may explain the inconsistencies found in the documentation.

Data from this study revealed a statistically significant reduction in 30-day hospital readmission rates from 22% in the pre-intervention period to just 4% in the post-intervention period in patients with cardiac diseases in nature, specifically CAD, HF, and dysrhythmias. Patients who did not receive the BOOST Risk Assessment Tool and associated interventions were 14 times more likely to be readmitted to the hospital within 30-day of index hospitalization. Our finding is similar to that of a study by Hansen et al (2013) in which 11 hospitals showed an absolute hospital admission reduction of 2.0% and a relative reduction of 13.6% one year after implementing Project BOOST in patients with various diagnoses including diabetes, arthroplasty, COPD, pneumonia, and organ transplantation. This suggests that the 8P Risk Assessment Tool may be a comprehensive method to identify the needs of the patient to decrease re-hospitalization in different patient populations.

While many studies exist about Native American health disparities and access to health care, there are limited studies on Native Americans' risks for hospital readmission. Approximately 30% of patients included in our analysis are Native Americans. This study provided data from the Native American population to determine what risk factors were significant in hospital readmission which were absence of a caregiver and poor health literacy

(100%, $X^2_{(1, n = 61)} = 3.90$, $p < .05$ and 100%, $X^2_{(1, n = 61)} = 19.15$, $p < .001$, respectively). In the pre-intervention period, Native Americans accounted for seven 30-day hospital readmissions. In the post-intervention period, Native Americans accounted for one 30-day hospital readmission. Project BOOST has been implemented in hospitals around the nation with success, the results of this study may support the application of Project BOOST to different population groups, including Native Americans and patients residing in rural areas.

Limitations

A limitation identified during this project was that the number of hospital readmissions in the post-BOOST group was rather small and this led to an unstable model for logistic regression analysis. Had this study included a longer pre- and post-intervention periods or larger sample, the model for logistic regression would be stable to provide a better picture into the use of Project BOOST. Samples were obtained with the purpose to evaluate the population within this geographic area; these results may not be generalized to other geographic locations. Types of interventions were beyond the scope of this work and interventions were categorized as present and absent. An additional limitation was the research design of the project. Had an experimental approach been used, the findings from this project may be more meaningful.

Future Studies

This retrospective descriptive comparative study provides information regarding the use of Project BOOST's 8P Risk Assessment Tool in a rural acute care facility. Future studies on risk identification for hospital readmission should include longer study periods both pre- and post-implementation to allow for adequate sampling and stable models of logistic regression when analyzing the data. Additionally, future studies are needed to determine if the 8P Risk

Assessment Tool can be implemented in a broader patient population to include all-cause admissions to further decrease hospital readmissions. Perhaps careful analysis of interventions that make most impact on the significant hospital re-admission reduction.

Conclusion

Prior to implementing Project BOOST, FMC's hospital readmission rate was above the national average of 19.2% (Hodge, 2015). With in-depth patient evaluation and documentation of interventions related to Project BOOST implementation, hospital readmissions continued to decrease with FMC's readmission rate falling below the national average. Using Project BOOST helped to determine what risk factors and diagnoses were most likely to cause readmission, thus allowing health care providers to formulate a successful interventions and discharge plans for the patient. Data from this DNP project helped to identify what risk factors were most likely to cause hospital readmission. Using this information, interventions were put into place to make ensure a low number of hospital readmissions.

APPENDIX A

LETTER OF SUPPORT FROM STUDY SITE

Northern Arizona Healthcare
Flagstaff Medical Center • Verde Valley Medical Center

April 27, 2015

University of Arizona
Human Subjects Protection Program
POB 210409
Tucson, AZ 85721

RE: Jennifer Armfield - "Project BOOST and Heart Failure Readmission in a Rural Acute Care Facility"

To Whom It May Concern:

Jennifer Armfield was added as a research team member to the paired studies: Precision Population Health Management: Personalized Transitional Medicine for Anglo and Hispanic Populations in Northern Arizona and Precision Population Health Management: Personalized Transitional Medicine for Native American Populations in Northern Arizona August 27, 2014. Her role is to conduct retrospective chart reviews of patients enrolled in the paired studies to evaluate their "BOOST" assessment documentation. The "BOOST" (Better Outcomes by Optimizing Safe Transitions) project uses a screening tool to evaluate eight risk factors (the 8Ps) believed to identify and address all hospitalized patients for risk of hospital readmission within 30-days of discharge. The factors include: patients with polypharmacy, psychological (depression/history of depression), principle diagnosis (cancer, stroke, diabetic complications, COPD, or heart failure), physical limitations, poor health literacy, poor social support, prior hospitalization, and palliative care. The "BOOST" assessment was integrated in the electronic medical record May 26, 2014. Jennifer will sample participates pre/post implementation of the new computerized process. Participants will be selected from the study data base.

We are pleased to have Jennifer as part of our research team. If you have questions or need further information, please do not hesitate to contact us.

Sincerely,

Cynthia Beckett, PHD
Co-Primary Investigator-NAH
Director Evidence Based Practice/Research
Northern Arizona Healthcare-Flagstaff Medical Center
1200 N. Beaver Street
Flagstaff, AZ 86001

Mark Carroll, MD
Co-Primary Investigator-NAH
Chief Medical Officer
Northern Arizona Healthcare-Flagstaff Medical Center
1200 N. Beaver Street
Flagstaff, AZ 86001

Robert Trotter, II, PhD
Primary Investigator NAU
Associate Vice President for Health Research Initiatives
Northern Arizona University
P.O. Box 4087
1298 W. Knoles Drive,
Suite 240
Flagstaff, AZ 86011-4087

APPENDIX B

INSTITUTIONAL REVIEW BOARD APPROVAL

THE UNIVERSITY OF ARIZONA

Human Subjects
Protection Program

1618 E. Helen St.
P.O.Box 245137
Tucson, AZ 85724-5137
Tel: (520) 626-6721
http://orcr.arizona.edu/hspp

Date:	July 07, 2015
Principal Investigator:	Jennifer Armfield
Protocol Number:	1506941849
Protocol Title:	Project BOOST and Heart Failure Readmission in a Rural Acute Care Facility
Determination:	Human Subjects Review not Required

The project listed above does not require oversight by the University of Arizona because the project does not meet the definition of 'research' and/or 'human subject'.

- **Not Research as defined by 45 CFR 46.102(d):** As presented, the activities described above do not meet the definition of research as cited in the regulations issued by the U.S. Department of Health and Human Services which state that "research means a systematic investigation, including research development, testing and evaluation, designed to contribute to generalizable knowledge".
- **Not Human Subjects Research as defined by 45 CFR 46.102(f):** As presented, the activities described above do not meet the definition of research involving human subjects as cited in the regulations issued by the U.S. Department of Health and Human Services which state that "human subject means a living individual about whom an investigator (whether professional or student) conducting research obtains data through intervention ***or*** interaction with the individual, or identifiable private information".

Note: Modifications to projects not requiring human subjects review that change the nature of the project should be submitted to the Human Subjects Protection Program (HSPP) for a new determination (e.g. addition of research with children, specimen collection, participant observation, prospective collection of data when the study was previously retrospective in nature, and broadening the scope or nature of the research question). Please contact the HSPP to consult on whether the proposed changes need further review.

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

APPENDIX C

LETTER OF ADDITION TO FLINN GRANT

Northern Arizona Healthcare

1200 North Beaver Street
Flagstaff, Arizona 86001
928-779-3366
http://www.nahealth.com

TO:	Mark Carroll, MD
STUDY/ACTIVITY TITLE:	[497993-9] Precision Population Health Management: Personalized Transitional Medicine for Anglo and Hispanic Populations in Northern Arizona.
SUBMISSION TYPE:	**Amendment/Modification**
REVIEW TYPE:	**Expedited Review**
ACTION:	**APPROVED**
APPROVAL DATE:	**August 27, 2014**
NEXT REVIEW DUE:	**October 14, 2014**
SPONSOR:	Flinn Grant
RECUSALS:	
CHANGE:	Addition of Jennifer Armfield as study team member

Your AMENDMENT/MODIFICATION REQUEST has been APPROVED by the Northern Arizona Healthcare Institutional Review Board (NAH IRB) under the category of Expedited Review based on applicable regulations. This approval is based on an appropriate risk/benefit ratio and a project design wherein the risks have been minimized. All research and/or activities must be conducted in accordance with this approved submission.

This study/activity has been determined to be a Minimal Risk project and is operating under informed consent. It requires continuing review by NAH IRB on an annual basis unless otherwise noted in your review date. Please use the appropriate forms for this procedure.

Also, please be advised of the following stipulations of continuing approval for all NAH IRB studies/ activities, as applicable:

- **Review/Continuation of Study/Activity:** Must be submitted to the IRB three (3) weeks prior to the study/activity review date and you will receive a courtesy reminder notice in advance of the deadline for submission (Next Review date is noted above, if applicable). Note that late submissions may result in studies/activities being temporarily suspended and/or closed to accrual of new subjects, or permanent closure;
- **Amendments or Changes (Protocol or Consent Form):** Unless done to eliminate immediate hazard to the subject/patient, any and all changes in the study/activity must be promptly submitted to the IRB and approved by the IRB prior to their implementation (i.e., Protocol revisions, Investigator/ Treating Physician changes, consent form revisions, etc.);
- **Risks and Information:** Unanticipated risks and new relevant information that may impact the risk/ benefit ratio of the test article for the subject must be submitted to the IRB within five (5) working days:

- **Adverse Events**: Prompt reporting is required for events that are (a) unanticipated (i.e., not identified as reasonably foreseeable in the protocol and/or consent form and (b) of sufficient seriousness to affect the relative risks and benefits of participating in the study/activity as contemplated by the approved protocol and/or consent form). "Prompt" is defined to mean as soon as the seriousness of the issue reasonably demands. Serious adverse events should be reported to the IRB within one (1) week of Investigator/Treating Physician becoming aware of the event; any other unanticipated problem should be reported to the IRB within two (2) weeks.
- **Life Threatening/Death Events**: Any life-threatening event or study-related death must be submitted to the IRB within twenty-four (24) hours.
- **Emergency Use**: Emergency use of an Investigational Drug in a life-threatening situation, which must be documented and certified by an uninvolved Hospital physician, i.e., that the emergency existed which required use of the investigational article, must be submitted to the IRB within five (5) working days; and
- **Informed consent**: If applicable, please remember that informed consent is a process beginning with a description of the project and assurance of participant understanding followed by a signed consent form. Informed consent must continue throughout the project via a dialogue between the researcher and research participant. Federal regulations require that each participant receives a copy of the consent document.

Please note that all research records must be retained for a **minimum** of three years after the completion of the project.

The IRB maintains the authority to terminate or suspend approval of research that is not being conducted in accordance with stated IRB requirements or that has been associated with unexpected serious harm to subjects. The IRB operates in compliance with 21 Code of Federal Regulations ("CFR") Part 56 and 45 CFR Part 46.

If you have any questions, please contact Paula McAllister at: 928-214-3616 or paula.mcallister@nahealth.com. Please include your project title and reference number in all correspondence with this office.

This letter has been electronically signed in accordance with all applicable regulations, and a copy is retained within Northern Arizona Healthcare Institutional Review Board's records.

APPENDIX D

FLINN FOUNDATION PROJECT EXECUTIVE SUMMARY

Flinn Foundation Project

Precision Population Health Management: Integrated Paired Proposals for Personalized Transitional Medicine for Native American, Hispanic, and Anglo Populations in Northern Arizona

Executive Summary

Flagstaff Medical Center and Northern Arizona University are conducting a joint research project to help improve care for patients with heart disease following hospitalization. The goals of this project are to improve the evidence-based programs for transitional care in home and community settings, by identifying both the cultural and environmental factors that help or hinder the care process after patients are discharged from the hospital.

Researchers from NAU and FMC hope to improve hospital programs for post discharge care in community settings in Northern Arizona by producing culturally informed, personalized, and effective care models for Native American, Hispanic, and Anglo populations. This project is funded by the Flinn Foundation, and has an expected duration of 2 years.

This pilot study will include 1) health care professionals associated with FMC transitional care programs, and 2) patients formerly hospitalized at FMC with a primary discharge diagnosis of congestive heart failure, or myocardial infarction who reside in under-served neighborhoods in Flagstaff or regional rural locations in Northern Arizona.

Goals and Objectives

The general objective of the project is to develop and test best practice protocols/processes for implementation of innovative precision medicine discharge and transitional protocols within multicultural, underserved communities in Northern Arizona. The best practices model and protocols will be culturally congruent with Native American, Hispanic and Anglo patient populations, as well as underserved, rural high-risk patient populations living outside and on tribal reservations.

The specific objectives are:

1. To assess and improve FMC transitional care risk stratification processes for Native American, Hispanic and Anglo patients hospitalized with serious cardiac disease (CHF and MI). (FMC primary, NAU secondary);
2. To identify patient-preferred methodologies for inclusion of home monitoring and other community outreach transitional care activities. (NAU primary, FMC secondary).
3. To assess and improve FMC transitional care processes for heart disease and chronic disease management based on patient environment, beliefs, behavior, and culture. (FMC/NAU Joint)
4. To pilot test the improved transitional care processes for cross-cultural applicability, fidelity, and feasibility of deployment. (NAU/FMC Joint).

APPENDIX E

8P RISK ASSESSMENT TOOL

project BOOST
Better Outcomes by Optimizing Safe Transitions

The 8Ps:
Assessing Your Patient's Risk For Adverse Events After Discharge

Risk Assessment: 8P Screening Tool (Check all that apply.)	**Risk Specific Intervention**	**Signature of individual responsible for insuring intervention administered**
Problem medications (anticoagulants, insulin, oral hypoglycemic agents, aspirin & clopidogrel dual therapy, digoxin, narcotics) ☐	☐ Medication specific education using Teach Back provided to patient and caregiver ☐ Monitoring plan developed and communicated to patient and aftercare providers, where relevant (e.g. warfarin, digoxin and insulin) ☐ Specific strategies for managing adverse drug events reviewed with patient/caregiver ☐ Follow-up phone call at 72 hours to assess adherence and complications	
Psychological (depression screen positive or h/o depression diagnosis) ☐	☐ Assessment of need for psychiatric aftercare if not in place ☐ Communication with aftercare providers, highlighting this issue if new ☐ Involvement/awareness of support network insured	
Principal diagnosis (cancer, stroke, DM, COPD, heart failure) ☐	☐ Review of national discharge guidelines, where available ☐ Disease specific education using Teach Back with patient/caregiver ☐ Action plan reviewed with patient/caregivers regarding what to do and who to contact in the event of worsening or new symptoms ☐ Discuss goals of care and chronic illness model discussed with patient/caregiver	
Polypharmacy (≥5 more routine meds) ☐	☐ Elimination of unnecessary medications ☐ Simplification of medication scheduling to improve adherence ☐ Follow-up phone call at 72 hours to assess adherence and complications	
Poor health literacy (inability to do Teach Back) ☐	☐ Committed caregiver involved in planning/administration of all general and risk specific interventions ☐ Aftercare plan education using Teach Back provided to patient and caregiver ☐ Link to community resources for additional patient/caregiver support ☐ Follow-up phone call at 72 hours to assess adherence and complications	
Patient support (absence of caregiver to assist with discharge and home care) ☐	☐ Follow-up phone call at 72 hours to assess condition, adherence and complications ☐ Follow-up appointment with aftercare medical provider within 7 days ☐ Involvement of home care providers of services with clear communications of discharge plan to those providers	
Prior hospitalization (non-elective; in last 6 months) ☐	☐ Review reasons for re-hospitalization in context of prior hospitalization ☐ Follow-up phone call at 72 hours to assess condition, adherence and complications ☐ Follow-up appointment with aftercare medical provider within 7 days	
Palliative care (Would you be surprised if this patient died in the next year? Does this patient have an advanced or progressive serious illness?) Yes to either: ☐	☐ Assess need for palliative care services ☐ Identify goals of care and therapeutic options ☐ Communicate prognosis with patient/family/caregiver ☐ Assess and address bothersome symptoms ☐ Identify services or benefits available to patients based on advanced disease status ☐ Discuss with patient/family/caregiver role of palliative care services and benefits and services available	

APPENDIX F

GENERALIZED ASSESSMENT OF PREPAREDNESS

General Assessment of Preparedness (GAP)

Prior to discharge, evaluate the following areas with the patient/caregiver(s) and ambulatory medical care providers: A = Beginning upon admission; P = Prior to discharge; D = At discharge

Logistical Issues			**Psychosocial Issues**		
1. Functional status assessment completed (P)	Yes	No	1. Substance abuse/dependence evaluated (A)	Yes	No
2. Access (e.g. keys) to home insured (P)	Yes	No	2. Abuse/neglect presence assessed (A)	Yes	No
3. Home prepared for patient's arrival (e.g. medical equipment, safety evaluation, food)	Yes	No	3. Cognitive status asserted (A)	Yes	No
			4. Advanced care planning documented (A)	Yes	No
4. Financial resources for care needs assessed (P)	Yes	No	5. Support circle for patient identified (P)	Yes	No
5. Ability to obtain medications confirmed (P)	Yes	No	6. Contact information for home caregivers obtained and provided to patient (D)	Yes	No
6. Responsible party for insuring med adherence identified/prepared, if not patient (P)	Yes	No			
7. Transportation to initial follow-up arranged (D)	Yes	No			
8. Transportation home arranged (D)	Yes	No			

Confirmed by: _____ _____ ___/ ___/ ___

APPENDIX G

PATIENT HEALTH QUESTIONNAIRE-9

PATIENT HEALTH QUESTIONNAIRE-9 (PHQ-9)

Over the last 2 weeks, how often have you been bothered by any of the following problems? *(Use "✔" to indicate your answer)*	**Not at all**	**Several days**	**More than half the days**	**Nearly every day**
1. Little interest or pleasure in doing things	0	1	2	3
2. Feeling down, depressed, or hopeless	0	1	2	3
3. Trouble falling or staying asleep, or sleeping too much	0	1	2	3
4. Feeling tired or having little energy	0	1	2	3
5. Poor appetite or overeating	0	1	2	3
6. Feeling bad about yourself — or that you are a failure or have let yourself or your family down	0	1	2	3
7. Trouble concentrating on things, such as reading the newspaper or watching television	0	1	2	3
8. Moving or speaking so slowly that other people could have noticed? Or the opposite — being so fidgety or restless that you have been moving around a lot more than usual	0	1	2	3
9. Thoughts that you would be better off dead or of hurting yourself in some way	0	1	2	3

FOR OFFICE CODING 0 + _____ + _____ + _____

=Total Score: _____

If you checked off any problems, how difficult have these problems made it for you to do your work, take care of things at home, or get along with other people?

Not difficult at all	**Somewhat difficult**	**Very difficult**	**Extremely difficult**
☐	☐	☐	☐

APPENDIX H

HEALTH LITERACY ASSESSMENT – REALM

REALM-SF

Patient name _____ Date of birth _____ Reading level _____

Date _____ Examiner _____ Grade level _____

Menopause	☐
Antibiotics	☐
Exercise	☐
Jaundice	☐
Rectal	☐
Anemia	☐
Behavior	☐

Instructions for Administering the REALM-SF (Short Form)

1. Give the patient a laminated copy of the REALM-SF form and score answers on an un-laminated copy that is attached to a clipboard. Hold the clipboard at an angle so that the patient is not distracted by your scoring. Say:

   > "I want to hear you read as many words as you can from this list. Begin with the first word and read aloud. When you come to a word you cannot read, do the best you can or say, 'blank' and go on to the next word."

2. If the patient takes more than 5 seconds on a word, say "blank" and point to the next word, if necessary, to move the patient along. If the patient begins to miss every word, have him or her pronounce only known words.

REFERENCES

42 CFR 412.152 - Definitions for the Hospital Readmissions Reduction Program. (n.d.). Retrieved April 30, 2014, from http://www.law.cornell.edu/cfr/text/42/412.152?qt-cfr_tabs=1#qt-cfr_tabs

Carlin, B., Wiles, K., & Easley, D. (2012). Rehospitalization Rates and Clinical Characteristics of Patients Enrolled in a Transition of Care Program Following Hospitalization for Congestive Heart Failure. *CHEST Journal, 142* (4_MeetingAbstracts), 114A.

Centers for Medicare and Medicaid Services [CMS] (2010). Medicare Fact Sheet. Retrieved October 11, 2014 from http://www.cms.gov/Medicare/Medicare-Fee-for-Service-Payment/AcuteInpatientPPS/Downloads/FSQ09_IPLTCH11_NPRM041910.pdf

Cerner Corporation (2011). Cerner Millennium [computer software]. Kansas City, MO.

Coleman, E. (n.d.). The Care Transitions Program. Retrieved April 23, 2014 from http://www.caretransitions.org/index.asp

Coleman E., Barbaccia J., & Croughan-Minihane, M. Hospitalization Rates in Nursing Home Residents with Dementia: A Pilot Study of the Impact of a Special Care Unit. *Journal of the American Geriatrics Society*. 1990; 38(2):108-12

Davis, T., Michielutte, R., Askov, E., Williams, M., & Weiss, B. (1998) Practical Assessment of Adult Literacy in Health Care. *Health Education & Behavior, 25*:613-624.

Epstein, A., Jha, A., & Orav, E. (2011). The Relationship between Hospital Admission Rates and Rehospitalizations. *New England Journal of Medicine, 365*(24), 2287-2295.

Epstein-Lubow, G., Baier, R., Butterfield, K., Gardner, R., Babalola, E., Coleman, E., & Gravenstein, S. (2014) Caregiver presence and patient completion of a Transitional Care Intervention. *The American Journal of Managed Care,* 20(10), e439-e444.

Gemme, D., Kent, E., Thompson, M., Retalic, T., Chung, E., Coleman, K., & Meyer, T. (1998). Reduction of hospital readmissions for heart failure employing an outpatient program aimed at patient self-reliance. *Journal of Cardiac Failure, 4*(3), 51.

Grimmer, K., Dryden, L., Puntumetakul, R., Young, A., Guerin, M., Deenadayalan, Y., & Moss, J. (2006). Incorporating Patient Concerns into Discharge Plans: Evaluation of a Patient-Generated Checklist. *The Internet Journal of Allied Health Sciences and Practice* 4(2).

Hansen, L., Young, R., Hinami, K., Leung, A., & Williams, M. (2011). Interventions to Reduce 30-Day Rehospitalization: A Systematic Review. *Annals of Internal Medicine, 155*(8), 520.

Hansen, L., Greenwald, J., Budnitz, T., Howell, E., Halasyamani, L., Maynard, G., Vidyarthi, A., Coleman, E., Williams, M. (2013). Project BOOST: Effectiveness of a multihospital effort to reduce rehospitalization. *Journal of Hospital Medicine* 8(8) 421-427.

Healthcare 411. (n.d.). Retrieved April 23, 2014, from http://www.ahrq.gov/professionals/quality-patient-safety/quality-resources/tools/literacy/index.htm

Hodge, C. (2015) Centers for Medicare and Medicaid Services: Office of Minority Health. Medicare Hospital Readmissions Among Minority Populations. Retrieved October 30, 2016 from https://www.cms.gov/About-CMS/Agency-Information/OMH/Downloads/OMH_Dwnld-MedicareHospitalReadmissionsAmongMinorityPopulations.pdf

Hospital Quality Initiative. (n.d.). Retrieved December 06, 2014, from http://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/HospitalQualityInits

IBM (2016) Statistical Package for the Social Sciences (SPSS) (Version 24) [Software]. Available from http://www-01.ibm.com/software/analytics/spss/downloads.html

Jencks, S., Williams, M., & Coleman, E. (2009). Rehospitalization among Patients in the Medicare Fee-for-Service Program. *New England Journal of Medicine, 360*(14), 1418-1428.

Kind, A., Jensen, L., Barczi, S., Bridges, A., Kordahl, R., Smith, M., & Asthana, S. (2012). Low-Cost Transitional Care with Nurse Managers Making Mostly Phone Contact with Patients Cut Rehospitalization At A VA Hospital. *Health Affairs, 31*(12), 2659-2668.

Lavizzo-Mourey MD, Risa (2013). The Revolving Door: A Report on US Hospital Readmissions – An analysis of Medicare data by the Dartmouth Atlas Project. Retrieved April 24, 2014 from http://www.rwjf.org/content/dam/farm/reports/reports/2013/rwjf404178

Lui, L.M. (2014) Deprescribing: An Approach to Reducing Polypharmacy in Nursing Home Residents. *The Journal for Nurse Practitioners,* 10(2), 136-139.

Manning, Shannon (2011). Bridging the Gap between Hospital and Home: A new model of care for reducing readmission rates in chronic heart failure. *The Journal of Cardiovascular Nursing* 26(5), 368-376.

MEETINGS AND EDUCATION. (n.d.). Retrieved December 06, 2014, from http://www.hospitalmedicine.org/

Medical Information Data Analysis System (MIDAS), (2014). HF Volumes 5.15 CVD.xlsx Report. Tucson, AZ.

Moore, C., McGinn, T., and Halm, E. (2007). Tying Up Loose Ends: Discharging Patients with Unresolved Medical Issues. *Archives of Internal Medicine,* 167(12):1305-1311.

Moran, K., Burson, R., & Conrad, D. (2014). The *doctor of nursing practice scholarly project: A framework for success*. Burlington, MA: Jones & Bartlett Learning.

Naylor, M. (1990). Comprehensive Discharge Planning for Hospitalized Elderly: A Pilot Study. *Home Healthcare Nurse: The Journal for the Home Care and Hospice Professional, 8*(5), 48.

Naylor, M. (2000). A Decade of Transitional Care Research with Vulnerable Elders. *Journal of Cardiovascular Nursing* 14(3):1-14.

Northern Arizona University (2014). THRIVE Current Projects. Retrieved August 28, 2014 from http://nau.edu/Research/HRI/Current-Research-Projects/

Outcome Measures. (n.d.). Retrieved April 23, 2014, from http://www.cms.gov/Medicare/ Quality-Initiatives-Patient-Assessment-Instruments/HospitalQualityInits/ OutcomeMeasures.html

Patient Health Questionnaire (PHQ) Screeners. Free Download. (n.d.). Retrieved April 24, 2014, from http://www.phqscreeners.com/overview.aspx?Screener=02_PHQ-9

Peng, C-Y., Lee, K.L., & Ingersoll, G.M. (2002). An Introduction to Logistic Regression Analysis and Reporting. *The Journal of Educational Research* 96(1), 3-15.

Presser, S., Subramanian, U., Perkins, S., Gradus-Pizlo, I., Kareken, D., Kim, J.., Ding, Y., Sauve, M., & Sloan, R. (2010). Measuring Depressive Symptoms in Heart Failure: Validity and Reliability of the Patient Health Questionnaire-8. *American Journal of Critical Care* 20(2), 146-152.

Project BOOST Team. The Society of Hospital Medicine. Care Transitions Implementation Guide: Project BOOST: **B**etter **O**utcomes by **O**ptimizing **S**afe **T**ransitions. Society of Hospital Medicine website, Care Transitions Quality Improvement Implementation Toolkit. Retrieved October 1, 2013 from http://www.hospitalmedicine.org

Rabin R. Health care's "dirty little secret": no one may be coordinating care. http://www.kaiserhealthnews.org/Stories/2013/April/30/Coordination-of-care.aspx. Published 2013. Accessed January 7, 2016

Rau, J. (2013). Rehospitalization Rates Fell in First Year of Medicare Penalties. Retrieved April 24, 2013 from http://capsules.kaiserhealthnews.org/index.php/2013/12/rehospitalization-rates-fell-in-first-year-of-medicare-penalties/

Readmissions Reduction Program. (n.d.) Retrieved April 23, 2014, from http://www.cms.gov/Medicare/Medicare-Fee-for-Service-payment/AcuteInpatientPPS/Readmissions-Reduction-Program.html

Ross, J. S., Chen, J., Lin, Z., Bueno, H., Curtis, J. P., Keenan, P. S., & Krunholz, H. M. (2010). Recent national trends in readmission rates after heart failure hospitalization. *Circulation Heart Failure, 3*, 97-103. http://dx.doi.org/DOI:10.1161/CIRCHEARTFAILURE.109.885210

Schillinger, D. (2003). Closing the Loop: Physician Communication With Diabetic Patients Who Have Low Health Literacy. *Archives of Internal Medicine, 163*(1), 83-90.

Schopfer, D. W., Whooley, M. A., & Stamos, T. D. (2012). Hospital compliance with performance measures and 30-day outcomes in patients with heart failure. *American Heart Journal*, 164(1), 81-86. http://dx.doi.org/doi:10.1016/j.ahj.2012.04.017

Social Security Administration. Compilation of the Social Security Laws: Payment to Hospitals for Inpatient Hospital Services. Retrieved August 14, 2014 from http://www.ssa.gov/OP_Home/ssact/title18/1886.htm

Society of Hospital Medicine (2015) Risk Assessment Tool: The 8Ps. Retrieved November 30, 2014 from http://www.hospitalmedicine.org/Web/Quality_Innovation/Implementation_Toolkits/Project_BOOST/Web/QualityInnovation/Implementation_Toolkit/Boost/BOOST_Intervention/Tools/Risk_Assessment.aspx

Yancy, C. W., Jessup, M., Bozkurt, B., Butler, J., Casey, D. E., Drazner, M. H., ... Wilkoff, B. 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*(16), E240-E327.