

2020

## Pulmonary Rehabilitation: A Quality Improvement Evaluation

Michelle Groth  
*Walden University*

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# Walden University

College of Health Sciences

This is to certify that the doctoral study by

Michelle Groth

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Review Committee

Dr. Mattie Burton, Committee Chairperson, Nursing Faculty

Dr. Roneisa Matero, Committee Member, Nursing Faculty

Dr. Jonas Nguh, University Reviewer, Nursing Faculty

Chief Academic Officer and Provost

Sue Subocz, Ph.D.

Walden University

2020

Abstract

Pulmonary Rehabilitation: A Quality Improvement Evaluation

by

Michelle Groth MSN, FNP-BC, ACNP-BC

MS, Indiana State University, 2005

BS, University of Michigan - Flint, 2001

Proposal Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Nursing Practice

Walden University

May 2020

## Abstract

COPD is a progressive, multifaceted, chronic disease with steadily increasing worldwide rates of prevalence, morbidity and mortality, making improved COPD care a global health priority. Current practice guidelines are in place, but the literature continues to demonstrate inadequacies in practice, for example the inconsistent use of pulmonary rehabilitation (PR). The purpose of the project was to conduct a quality improvement initiative evaluation of the PR program at a hospital in south-central Idaho. The practice-focused question was: What impact has implementation of a PR program had on COPD care in the area? Donabedian's framework for healthcare quality evaluation was the theoretical foundation for the project; de-identified data from the hospital and PR program were used. Sources of evidence included current clinical practice guidelines for COPD and PR programs, literature on current COPD care practices, and national standards for rate of COPD readmissions. Results indicated a 21% increase in PR use since program inception, improvements in functional capacity in those who completed at least 10 weeks of PR as measured by the objective measures of max METS and get up and go scores and a higher probability than chance that participating in PR improved the subjective functional capacity measures of strength, endurance and balance. Due to lack of access to readmission data prior to initiation of the PR program, a direct relationship between PR use and readmission rates could not be determined. This project resulted in positive social change through increasing awareness and understanding of the essential role of PR in COPD care.

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## Dedication

I dedicate this project to my children and grandchildren. Wanting to be the best version of myself for you has been the driving force behind all I have done. Without your love, patience, encouragement and support, none of this would have been possible! Being your Mom and Grammy has taught me that we should always dream big, work hard, love harder and try to have a little fun along the way!

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## Section1: Nature of the Project

### **Introduction**

Chronic obstructive pulmonary disease (COPD) is a leading cause of death in the United States, with an estimated 16 million people currently living with the disease and millions more who are yet to be diagnosed (National Institute of Health, 2017). COPD is a multifaceted, progressive, chronic health condition with systemic manifestations and common comorbidities (Nici & Zuwallack, 2012) affecting individuals from all genders, races, and economic status without prejudice and imposing a heavy humanistic and economic burden (Srivastava, Thakur, Sharma, & Pumekar, 2015). Guidelines outlining recommendations for care of individuals with COPD are in place and regularly updated (Global Initiative for Chronic Obstructive Lung Disease, 2020). However, the literature continues to show gaps between recommended best evidence-based care and actual clinical practice. These gaps have resulted in steadily climbing rates of morbidity and mortality that are attributable to COPD, as well as escalating associated direct and indirect healthcare costs (Boulet, Bourbeau, Skomro, & Gupta, 2013). Therefore, improving the quality of care provided to those with COPD has the potential to not only significantly improve quality of life in affected individuals, but also to decrease the associated heavy economic and social burdens (Lemmens et al., 2013).

In the years since the Institute of Medicine reported that medical errors result in the death of between 44,000 and 98,000 people annually, intensive efforts have been made worldwide to improve the quality of healthcare being delivered (Parry et al., 2013). The Office of Disease Prevention and Health Promotion (2020) defines quality healthcare

as care that is safe, effective, efficient, timely, equitable, and patient-centered. Quality improvement is most often defined as the implementation of activities designed to bring about immediate improvement in the delivery of healthcare in a specific setting through use of systematic and data-guided processes (Hughes, 2008). Quality improvement initiatives involve implementation of interventions aimed at reducing gaps in care quality for a specific group of patients, and quality improvement research aims to inform policy and practice through evaluation of quality improvement initiatives (Lynn et al., 2007). Hickey and Brosnan (2017) explained that evaluation is necessary to make a systematic determination about the quality of healthcare. In their publication, *The Essentials of Doctoral Education for Advanced Nursing Practice*, the American Association of Colleges of Nursing (2006), clearly delineated the obligation of Doctor of Nursing Practice graduates to participate in activities and initiatives aimed at improving healthcare quality through evaluation. In keeping with this mandate and, as partial fulfillment of the graduation requirements for a DNP degree from Walden University, the aim of this capstone project was to improve the quality of care for COPD patients by evaluating a quality improvement initiative at a hospital in south-central Idaho.

### **Problem Statement**

Despite irrefutable evidence supporting the effectiveness of pulmonary rehabilitation (PR) in improving the quality of life for those with COPD and reducing the number of COPD exacerbations requiring hospitalization, and current practice recommendations that PR be the first-line, non-pharmacologic intervention in the treatment of COPD (Global Initiative for Obstructive Lung Disease, 2020), use and

uptake of PR across the country continues to be low; rates of COPD readmissions continue to be high; and the costs associated with the care for those with COPD continue to climb (Johnston & Grimer-Somers, 2010) including at a hospital in south-central Idaho. Care provided at both the hospital and its affiliated outpatient clinics often does not fall in line with current practice guidelines for COPD management. As a result, the readmission rate for acute exacerbation of COPD continues to be high. PR services have been available to patients in the area for three years; however, knowledge among providers and patients on the role of PR in both improving the quality of life in patients with COPD and reducing the rate of exacerbations requiring hospitalization, remains low, which has resulted in underuse of the PR program.

In its report, *Crossing the Quality Chasm: A New Health System for the 21<sup>st</sup> Century*, the Institute of Medicine (2001) outlined six aims for improving healthcare. The second aim states that healthcare should be effective. For healthcare to be effective, it should be based on scientific evidence and should be expected to be of benefit to the patient. The report also outlined the role of nursing in improving healthcare quality; nurses should be equal partners with doctors and other healthcare professionals in the redesign of healthcare, and that effective workforce planning and policy development require improved data collection and information dissemination. The Agency for Healthcare Research and Quality (2012) stated that, through implementation of a culture of patient safety and display of a critical level of thinking, nurses can assure quicker and more sustained practice transformation, not only in the hospital and ambulatory care setting, but also in the community-based care setting. This statement reiterated the

important role of nursing in implementing evidence-based practice change and the overall improvement in healthcare quality outlined in the IOM's report. The changing healthcare environment offers distinct opportunities for DNP-prepared clinicians to improve healthcare. The Essentials of Doctoral Education for Advanced Nursing Practice outlines the program requirements that will best prepare the DNP to tackle these unique challenges. A DNP is equipped to promote new models of healthcare by promoting change through evidence-based, patient-centered care (Hammatt & Nies, 2015). A quality improvement evaluation of a PR program will improve care for those with COPD by providing stakeholders with the information necessary to improve use and uptake of the program.

### **Purpose**

The purpose of this DNP capstone project was to address the identified gap between the current practice guideline recommendation that PR serve as the first-line, non-pharmacologic intervention in the treatment of patients with COPD and the actual care being provided to patients in south-central Idaho through evaluation of the PR program as a quality improvement initiative. The guiding, practice-focused question for the project was as follows: "What impact has the PR program had on the care provided to individuals with COPD in south-central Idaho?" Completion of this capstone project and dissemination of the results will provide stakeholders with critical information on the value of the PR program as it stands, and the potential benefits that increased use of PR could bring for patients with COPD in south-central Idaho.

### **Nature of the Doctoral Project**

This project involved a multifaceted evaluation of the PR program's impact on COPD care and thus, multiple sources of evidence were used. These sources included clinical practice guidelines established by the Global Initiative for Chronic Obstructive Lung Disease (GOLD), American College of Chest Physicians (ACCP), the American Thoracic Society (ATS), the European Respiratory Society (ERS), the American Association of Cardiovascular and Pulmonary Rehabilitation (AACVPR), national standards of care established by Centers for Medicare & Medicaid Services (CMS) and currently available literature relevant to COPD, pulmonary rehabilitation, and COPD readmissions reduction. Data used for this project consisted of archival and operational data that has been continually collected and tracked by the hospital, since the hospital implemented an electronic medical records system in October 2016, and by the PR program, since opening in January of 2017. The data used included (a) the number of individuals referred to PR after hospitalization for exacerbation who completed at least 10 weeks of the program, (b) individual objective and subjective pre and post participation outcome measures and (c) the total number of hospital readmissions for COPD exacerbation immediately prior to and since the PR program opened. Collaboration in healthcare has been shown to reduce errors, improve patient outcomes, and reduce healthcare costs (Morley & Cashell, 2017) and thus a multidisciplinary team was used to organize and evaluate the evidence. The evaluation questions for the project were:

1. Is the current PR program being adequately used?

2. Do patient specific pre- and post-participation outcomes indicate improvement in functional capacity for those with COPD who participate in PR?
3. Has there been a reduction in the number of COPD readmissions at the hospital since the PR program was implemented?

It was anticipated that the results of the project would demonstrate the potential of the PR program to improve patient-specific outcome measures and reduce the rate of hospital admissions for COPD exacerbation. The results of this project will be used to improve awareness of providers and community members on the value of the PR program and to increase the rate of use and uptake of the program.

### **Significance**

Stakeholders are the individuals or organizations invested in a program, those interested in the results of program evaluation efforts, and those with a stake in dissemination of the results of the evaluation. Identifying and representing the needs of the stakeholders is essential to ensuring effective evaluation results as stakeholders can help or hinder an evaluation at any point in the process. Stakeholders are more likely to support evaluation of a quality improvement initiative if they are involved in the evaluation process and, likewise, an evaluation may be ignored, criticized, or resisted if stakeholder support is not maintained throughout the evaluation process (Centers for Disease Control and Prevention, 2012). Stakeholders for this project included all healthcare providers in the area, all staff of the PR program, hospital administrators and quality improvement staff, and, most importantly, patients in the area living with COPD and their families. Stakeholder support for this quality improvement initiative evaluation

was high and use of a multidisciplinary team helped to ensure stakeholder inclusion throughout the course of the project.

Evaluation from a healthcare perspective is defined as a systematic determination of the effectiveness or efficiency of a healthcare service or practice (Hughes, 2008). It relies on development of specific criteria on which the service or practice can be judged. These criteria can be developed with a variety of sources, including the perspectives of service users, stakeholders and healthcare providers, as well as evidence-based clinical practice guidelines. Evaluation in healthcare is important because it supports evidence-based practice and can help to identify gaps between available evidence and current clinical practice. Nurses can contribute to the evidence base by disseminating evaluation findings (Moule, Armoogum, Douglass, & Taylor, 2017). A thorough review of the current literature did not yield any studies in which evaluation of a PR program was conducted with Donabedian's structure, process, and outcomes model. Therefore, completion and dissemination of this DNP project will facilitate gains in the COPD evidence base and closure of the identified gap between established clinical practice guidelines for patients with COPD and current care provided to those with COPD in the area. There is already substantial national and global evidence available that demonstrates the potential benefits of PR in the management of COPD, and PR services are available at other hospitals within the organization, so transferability of the evaluation results is limited.

Walden University (2019) defines positive social change as the deliberate creation and application of ideas, strategies and actions with the goal of improving human and

social conditions. In healthcare, this definition implies a transformation at an individual, family, system, or organizational level that results in positive outcomes. Walden graduates possess the skills to transform knowledge into real-world solutions for critical social challenges and capstone projects completed as part of a degree requirement at Walden University must have a clear implication for positive social change. Completion of this capstone project will result in increased awareness and understanding of the essential role of PR in COPD care.

### **Summary**

Improving the care provided to individuals with COPD is a global health priority. It requires identifying gaps in current care practice, and the development, implementation, and evaluation of quality improvement initiatives and dissemination of the resulting evidence. As leaders, agents of change, program developers, and evaluators with a strong theoretical foundation, DNP-prepared advanced practice professionals are perfectly poised to lead the charge. While the first section of this paper served as an introduction to the practice-focused problem and a summary of the purpose, nature and significance of the proposed project, the next section will offer a more thorough exploration of the background and context for the project and will include an explanation of the theoretical underpinnings for the project, relevance of the project to nursing, local background relevant to the project, and the roles of all project team members.

## Section 2: Background and Context

### **Introduction**

Because of its prevalence, rising incidence and associated high personal, social and economic burden, COPD is a major public health problem (Agusti, 2018). The primary goals of COPD management are disease stabilization and prevention of exacerbation (Guarascio, Ray, Finch, & Self, 2013). Despite well-established and globally recognized clinical practice guidelines, gaps persist between the recommended best care practice and the actual care provided to those with COPD (Boulet, Bourbeau, Skomro & Gupta, 2013). One such gap is the persistently low use and uptake of PR across the country (Johnston, & Grimer-Somers, 2010) an example of this can be seen at the hospital in south-central Idaho where this project was completed.

To address the gap between current practice guidelines recommending that PR serve as the first-line, non-pharmacological intervention in the treatment of those with COPD and the actual care being provided in south-central Idaho, a quality improvement evaluation of the existing PR program was completed. The practice-focused question guiding the project was as follows: “what impact has the PR program had on the care provided to individuals with COPD south-central Idaho?” In this section of the paper the theoretical underpinnings of the project will be explained; relevance of the project to nursing practice will be demonstrated; the local background and context of the project will be illustrated; and the roles of all project team members, including the DNP student, will be examined.

### **Theoretical Underpinning**

In 1999, the IOM published the report, *To Err is Human: Building a Safer Health System*, in which medical errors were blamed for between 44,000 and 98,000 deaths annually. This report called for drastic reductions in medical errors through improvements in the quality of healthcare services. In 2001, the IOM's follow-up report, *Crossing the Quality Chasm, a New Health System for the 21<sup>st</sup> Century*, defined what constitutes quality of care, explained that suboptimal healthcare outcome measures are evidence that gaps in care quality exist, and outlined six aims for improving the overall quality of healthcare services. In the years since these reports were published, quality improvement initiatives have become a ubiquitous feature of the healthcare landscape.

In making a systematic determination about the quality of care, evaluation is a necessary and integral part of any quality improvement effort (Hickey & Brosnan, 2017). However, evaluation of quality improvement initiatives is often either not done, or done poorly, which diminishes the initiatives' contributions to the diffusion of healthcare innovation (Siriwardena, 2009). In response to the IOM's reports, the Health Services Research section of the U.S. Public Health Service tasked Avedis Donabedian, a physician and professor of medical care organization at the University of Michigan's School of Public Health, with reviewing the research on healthcare quality assessment (Ayanian & Markel, 2016). After reviewing the available literature Donabedian observed that the term "quality" meant different things to different people, but most commonly it reflected the current values and goals of a healthcare system and the larger society of which it is a part (Hickey & Brosnan, 2017). His landmark 1966 article and subsequent

framework for evaluating healthcare quality established him as a pioneer in the field of healthcare quality assurance. His framework is one of only a handful of robust models and frameworks for evaluating healthcare quality that remain relevant in the ever-changing world of healthcare (Ayanian & Markel, 2016). In his framework, Donabedian proposed that one could evaluate healthcare quality by using the approaches of structure, process, and outcome. He postulated that, while each of these approaches could be used individually, there seemed to be a unidirectional relationship between the constructs with good structure promoting good process, and good process promoting good outcome, thus evaluation of only one construct cannot provide a complete measure of overall quality (Ameh et al., 2017).

Donabedian (2005) defined *structure* as the physical and organizational aspects of care. Evaluation of structure can include examination of the setting in which the care takes place, the qualifications of the healthcare professionals providing the care, the tools and resources available to the providers and administrative support for the services provided. Donabedian emphasized the central role of structure in the evaluation process by identifying it as a prerequisite for process and outcomes. An example of structure evaluation would be determining if the location and resources of a quality improvement initiative facilitate achievement of the goals of the initiative. *Process* was defined as the components of the care delivered or, more specifically, all activities that take place between healthcare providers and patients. Process measurements can be further divided in to technical and interpersonal processes. Technical processes pertain specifically to activities aimed at promoting individual health and reducing risk, whereas interpersonal

processes focus more on the actual interactions between providers and patients. An example of process evaluation is the examination of an organization's specific healthcare practices to determine if they fall in line with nationally established clinical practice guidelines. Finally, *outcome* was defined by Donabedian as the measurable change in patient health status that results from the care delivered. Outcome measures are further divided in the categories of behavioral, experiential, clinical and financial. A change in a patient's healthcare practices (i.e. self-care) is an example of a behavioral outcome measurement, patient satisfaction with services provided is an example of experiential measurement, comparison of program specific outcomes to nationally established standards is an example of a clinical outcome measurement and evaluation of a reduction in payment penalty as the result of program implementation is an example of a financial outcome measurement. The simplicity and flexibility of Donabedian's framework facilitates use across the spectrum of healthcare disciplines making it an ideal choice for this interdisciplinary collaborative project.

Qu, Shewchuk, Chen & Richards (2010) used the SPO model to evaluate the quality of acute inpatient rehabilitation care for patients with spinal cord injury. In their study the SPO model was expanded to include environmental and patient characteristics and results of the study indicated that the SPO model was indeed applicable to care delivered to those with spinal cord injuries in the inpatient rehabilitation setting. The results also indicated that use of the expanded SPO model contributed to the explanation of quality when examining patient outcomes. Gardner, Gardner & O'Connell (2013) used the SPO model to examine the quality and safety of nursing service innovation,

specifically nurse practitioner service. A multidisciplinary team was used to collect, organize and analyze the data for this study, and the results indicated that the SPO model is a valuable approach for examining the safety and quality of a service innovation. Results also supported Donabedian's proposition that structure, process and outcome are not independent components but rather are interdependent. Finally, Moore, Lavoie, Bourgeois, & Lapointe (2015) used the SPO model to assess the performance of an integrated trauma system. Results of this study demonstrated significant correlations between the quality domains observed in the study and supported the SPO model as an effective model for evaluating trauma care. These studies all validate use of the SPO model in the evaluation of healthcare quality.

### **Relevance to Nursing Practice**

COPD is a heterogeneous group of respiratory conditions defined by predominantly irreversible airflow limitation. The primary risk factor for development of COPD is cigarette smoking, but other risk factors include exposure to second-hand smoke, occupational dust and chemicals, socioeconomic level, heredity, air pollution and a history of frequent and severe respiratory infections in childhood. Because COPD most typically presents after prolonged exposure to a noxious substance, it is most often diagnosed in middle-aged and elderly adults. Patients with COPD often have multiple comorbidities including cardiovascular disease and diabetes (Wier, Elixhauser, Pfunter, & Au, 2011). The level of airflow obstruction in COPD has a direct relationship to the severity of symptoms including dyspnea, chronic cough and wheezing. In turn, the severity of symptoms directly affects quality of life measures such as one's ability to

work, engage in normal activities of daily living, tolerate exercise and their sleep patterns (Srivastava, Thakur, Sharma & Puneekar, 2015).

There are currently 12 million adults in the U.S. living with COPD and COPD is now the third leading cause of both death and 30-day hospital readmissions (Press, Koneizka & White, 2018). The direct costs associated with COPD are nearly \$50 billion annually and the indirect costs, which include days of work lost and comorbid care costs, nearly double that number (Ford et al., 2015; Mannino, 2015). Acute exacerbations of COPD are responsible for up to 70% of COPD-related healthcare costs and COPD hospital readmissions account for over \$15 billion of the direct care costs (Shah, Press, Huisinigh-Scheetz, & White, 2016). In October 2014, under the auspices of their Hospital Readmissions Reduction Program, the Centers for Medicare and Medicaid Services expanded the list of diagnoses with associated readmission penalties to include COPD, making the reduction in the rate of COPD readmissions a national health priority (Agee, 2017).

Though reducing readmissions for individuals with chronic health conditions has become an increasing focus of healthcare policy, the current literature suggests that methods previously demonstrated to reduce readmissions in patients with other chronic diseases such as diabetes and congestive heart failure cannot be assumed to be effective for those with COPD (Agee, 2017). This same body of literature also indicates that once an exacerbation of COPD is underway, admission to the hospital is more difficult to avoid, and thus efforts aimed at reducing readmissions should focus more on prevention strategies. Over the past 2 decades several approaches to reducing COPD exacerbation

and hospital readmission in COPD have been implemented and evaluated including smoking cessation and vaccination programs, pharmacotherapy interventions, pulmonary rehabilitation, in-patient care bundles and post-discharge integrated disease management programs (Augusti et al., 2014; Matthews, Tooley, Nicholls & Lindsey-Halls, 2013; Russo et al., 2017).

In their cohort study of 23,971 U.S. military veterans, Au et al., (2009) found that smoking cessation significantly reduced the rate of COPD exacerbation, even after adjustment for age, comorbidities, COPD severity markers and disease severity (adjusted HR = 0.78; 95% confidence interval [CI] = 0.75-0.87). Several studies and meta-analyses have demonstrated the effectiveness of vaccination against influenza and pneumococcus, as well as the optimization of a guideline-directed oral and inhaled regimen in reducing risk of exacerbation in those with COPD (Augusti et al., 2014). Matthews, Tooley, Nicholls & Lindsey-Halls (2013) examined the relationship between use of in-patient care bundles in those admitted for COPD exacerbation and rate of hospital readmission after discharge. Results from the study indicate that, implementation of the care bundle over a 12-month period, resulted in both improvements in the care pathway for COPD patients and reductions in readmission. Finally, a retrospective study of 160 subjects at the Cleveland Clinic examining the impact of implementation of a post-discharge integrated disease management program on COPD readmissions found that, while 90-day readmission rates were lower for those who received any component of the post-discharge disease management program than for those who did not, 30-day readmission rates did not significantly change (Russo et al., 2017).

A strategy consistently shown to prevent acute COPD exacerbation and hospital readmission is PR (Steiner, 2015). PR is an evidence-based, comprehensive, multidisciplinary intervention for patients with COPD. The aim of PR is to reduce symptoms, increase patient participation and reduce the associated healthcare costs of COPD through optimization of functional status and reduction of the rate of hospitalization (Suh, Mandal, & Hart, 2013). In their systematic review, Punham et al., (2009) identified six studies with a total of 219 patients and found that participation in PR significantly reduced hospital admissions (pooled odds ratio 0.13 [95% CI 0.04 to 0.35]), and mortality (pooled odds ratio 0.29 [95% CI 0.10 to 0.84]). In another systematic review and meta-analysis of 18 studies, Moore et al., (2016) reported that results from 10 random-controlled studies indicated PR groups had lower rates of hospitalizations (control groups: 0.97 hospitalizations/patient-year; 95% CI, 0.67-1.40; PR groups: 0.62 hospitalizations/patient-year; 95% CI; 0.33-1.16); results from 5 studies revealed higher readmission rates in the 12 months prior to participation in PR compared to the 12 months after participation (before: 1.24 hospitalizations/patient-year; 95% CI, 0.66-2.34; after: 0.47 hospitalizations/patient-year; 95% CI; 0.28-0.79) and the pooled result of three cohort studies found that the reference group had a lower admission rate compared with the PR group (0.18 hospitalizations/patient-year; 95% CI; 0.11-0.32 for reference group vs. 0.28 hospitalizations/patient-year; 95% CI, 0.25-0.32 for the PR group). In a retrospective study Katajisto and Laitinen (2017) found that PR is efficient when measured by saved hospital days in severe COPD (8.4 hospital days before v. 3.3 days after  $p = 0.016$ ) with the best results observed in women, patients under 70 and those who

remained active at 1 year after completing PR. Finally, Holland and Hill (2011) found that PR commenced early following an acute exacerbation of COPD results in fewer hospital readmissions and reduced mortality. Based on the high-level of evidence, PR is recommended in all current clinical practice guidelines as the first-line, non-pharmacological intervention in the management of COPD, however use and uptake of PR continues to be low (Johnston & Grimmer-Somers, 2010).

### **Local Background and Context**

Prior to 2010, the south-central area of Idaho did not have a full-time pulmonologist and relied primarily on primary care providers and hospitalists for disease management in those with COPD. At that time however, despite rates of hospitalization for COPD exacerbation that exceeded the national average, the local hospital had not yet begun to feel the impact of the addition of COPD to CMS's hospital readmissions reduction program and thus improving COPD was not a healthcare priority. In July of 2010 a full-time pulmonology/critical care medicine physician was hired, and efforts aimed at improving the care provided to those with COPD began, but progress was slow. In October of 2012, in response to a mandate by the Affordable Care Act, CMS began reducing Medicare payments for inpatient prospective payment system hospitals with excess rates of readmission for specified diagnoses. For the first three years only excessive readmissions for myocardial infarction, heart failure and pneumonia readmissions were penalized. Then, in 2015, readmissions for complications after elective knee and hip surgery and COPD were added to the list of penalizable diagnoses (CMS, 2019). Many hospitals, including ones in south-central Idaho, saw their first

penalties related to COPD readmissions that same year, and a dramatic shift in priority for improving COPD care was seen. As part of this initiative, a PR program was designed and implemented in south-central Idaho, opening its doors in January of 2017. However, three years later, rates of use and uptake remain lower than expected and the rates of readmission for COPD exacerbation remain higher than expected. The demonstrable gap in care provided to individuals with COPD in the south-central area of Idaho area served as the impetus for this project and completion of this project provided stakeholders with information needed to justify increased use of the PR program as a means for improving patient outcomes and decreasing the rate of hospital readmissions for COPD exacerbation.

The setting for this DNP capstone project was a 224-bed, not-for-profit hospital serving an eight-county region in south-central Idaho and Northern Nevada, its affiliated outpatient pulmonary and primary care clinics located both in an attached medical professions building and in off-campus sites and its cardiopulmonary rehabilitation clinic which is housed in an off-campus medical professions complex across town. Between February 1<sup>st</sup>, 2017, and December 31<sup>st</sup>, 2019, the hospital had a total of 1000 COPD admissions and 69 readmissions. Patients admitted to the hospital for COPD exacerbation are admitted to either their primary care provider or the hospitalists group. There is currently a COPD order set available for use in these admissions, but use of the order set has, historically, been inconsistent. Pulmonology consult is not mandated as part of the order set and has also, historically, been variable based primarily on provider preference. For this project only those patients readmitted to the hospital for COPD exacerbation

within 30-days of discharge after their initial hospitalization for exacerbation were included for data analysis.

In the pulmonary clinic there are currently two providers – a nurse practitioner and a pulmonologist. Also, on staff in the pulmonary clinic, are two licensed practical nurses and a receptionist. The hospital’s pulmonary function lab is in the same suite as the pulmonary clinic and is currently staffed by three respiratory therapists. The PR clinic is staffed by four PhD prepared exercise physiologists, one of whom serves as the clinic director, three registered nurses, two respiratory therapists, a social worker, a dietician and two receptionists/support staff. The PR clinic is accredited through the American Association of Cardiovascular and Pulmonary Rehabilitation. During the first year that the PR clinic was open, classes were offered twice daily, from 11-12:30 pm and from 12:00-1:30 pm on Tuesdays and Thursdays, with the 30-minute overlap serving as a joint education session for both classes. When the number of patients referred to and attending PR exceeded the facility’s capacity, a third class at 2 pm was added. Since opening its doors, the PR clinic has had a total of 2,862 visits.

### **Role of the DNP Student**

As a pulmonary/critical care nurse practitioner at a hospital in Southwest Idaho for the past 6 years I treat patients with COPD in both the inpatient and outpatient setting. I serve as the pulmonary lead provider on the hospital readmissions committee and on the organization wide COPD care committee. I have also served as a clinical educator in the PR program. All DNP program required practicum hours were spent engaging in activities surrounding improving the use and uptake of the PR program, quality of the

services provided at the PR program and improving awareness of the gap between current practice guidelines and actual care provided. Practicum hours activities included COPD chart reviews, interdisciplinary meetings surrounding current inpatients and outpatient COPD care practices and education of PR staff and patients.

During my time in these roles, I have become acutely aware of gaps in the quality of care being provided to patients with COPD in the south-central Idaho community. The care provided often does not fall in line with the current clinical practice guidelines for COPD management established by the American Thoracic Society and the Global initiative for Chronic Lung Disease, and PR continues to be under-used. As a result, the readmission rate at the hospital for COPD exacerbation continues to be higher than expected. As an Advanced Practice Registered Nurse and Doctor of Nursing Practice student, it is my obligation, through leadership, advocacy, interprofessional collaboration and translation of evidence in to practice, to strive towards improving the quality of care provided to patients with COPD in the area. The first step towards achieving this goal is evaluation of the current PR program.

After 6 years as a pulmonary medicine provider in the area and feeling like many patients with COPD were “falling through the cracks,” the motivation for this doctoral project was simply a desire to bring care provided to COPD patients in the area in line with current evidence-based clinical practice guidelines. A secondary motivation was to help reduce the overall healthcare costs associated with COPD readmission. My primary role in this quality improvement initiative evaluation project was to assemble and lead the interdisciplinary team in identification of the practice problem, development of the

problem-focused evaluation questions, analysis of the data and dissemination of the project findings to stakeholders. I do not feel there were any personal biases that affected this project, but a potential for biased sampling did exist. This was addressed by including all eligible patients in the analysis for the evaluation questions examining referral to the PR program and hospital readmission reduction.

### **Role of the Project Team**

The Agency for Healthcare Research and Quality (2013) explained that quality improvement projects require problem solving, multi-layered decision-making and development of solutions for complex problems. They further noted that success of a quality initiative depends on use of the knowledge, skills, experiences and perspectives of individuals from a wide range of backgrounds. For this project, a multi-disciplinary team consisting of the director of the cardiopulmonary rehabilitation program, a pulmonary/critical care physician, who also serves as the director of the hospital's pulmonary and critical care services, the director of respiratory therapy services, a performance improvement specialist, the director of nursing research and a data analyst was formed. The DNP student recruited each of these team members based on their clinical expertise and ability to bring contextual insight to the project. Review of the current literature and guidelines surrounding the identified gap in practice was presented to the team primarily via oral communication, but supplemental materials including current practice guidelines and readmissions reduction committee data were also used. The team, led by the DNP student, explored the practice problem extensively through in-person meetings, telephone conferences and participation in the hospital's readmissions

reduction committee, and then identified the project purpose, goals practice-focused guiding & evaluation questions. Each member agreed to review and provide feedback on the project results to the DNP student prior to final submission to the DNP student's committee chair and again prior to dissemination. Data required for evaluation of the PR program's rate of use and uptake as well as indicators of the program's ability to improve patient outcome measures was compiled by the director of the cardiopulmonary rehabilitation program and provided to the DNP student in an Excel worksheet. Data required for evaluation of the impact of the PR program on hospital readmission rates for COPD was compiled and provided to the student by a hospital employed data analyst.

### **Summary**

Because of its prevalence, rising incidence and associated high personal, social and economic burdens, COPD is a major public health concern and improving the care provided to individuals with COPD is a global health priority. This requires identifying gaps in current care practice, development, implementation and evaluation of quality improvement initiatives and dissemination of resulting evidence. In, *The Essentials of Doctoral Education for Advanced Nursing Practice*, (2006) the American Association of Colleges of Nursing clearly delineated the obligation of DNP graduates to participate in activities and initiatives aimed at improving healthcare quality through evaluation. Through evaluation of a quality improvement initiative this capstone projects aimed to improve the quality of care provided to those with COPD in a south-central Idaho community. In the previous sections, the practice-focused problem and meaningful gap-in-practice were identified, the project purpose, goals, guiding & evaluation questions

were detailed and the theoretical underpinnings for the project were explained. In the next section of the paper the methods for collecting and analyzing the evidence used for completion of the project will be examined.

### Section 3: Collection and Analysis of Evidence

#### **Introduction**

COPD is a debilitating disease with systemic effects. The most common of these, skeletal muscle dysfunction, is characterized by loss of skeletal muscle mass and overall function, with varying degrees of dyspnea, physical deconditioning, and difficulties in performing activities of daily living (Alfarroba et al., 2016). Because of its prevalence, rising incidence and associated high personal, social and economic burden, COPD is a major public health problem (Agusti, 2018). The primary goals of COPD management are disease stabilization and preventing of exacerbation (Guarascio, Ray, Finch & Self, 2013).

Participation in PR, a comprehensive, multidisciplinary program, has been shown to be effective in reducing the number of COPD exacerbations that require hospitalization and improving both overall functional capacity and quality of life (Harrison et al., 2014). Evidence-based clinical practice guidelines for the treatment of COPD and prevention of exacerbations have been established by the ATS and the GOLD program. These guidelines identify PR as the most important non-pharmacologic intervention for treating COPD and preventing exacerbation (Casaburi & ZuWallack, 2009). However, use and uptake of PR continues to be low across the country with a hospital in south-central Idaho serving as an example. As a means for improving care for patients with COPD and avoiding reductions in Medicare payments secondary to COPD readmission rates that exceed the acceptability rate established by CMS, improving care for patients with COPD

through design, implementation and evaluation of quality improvement initiatives became a priority.

In this section of the paper the practice-focused question guiding the project, as well as the overall purpose of the project and the evaluation questions used to answer the practice-focused guiding question will be reviewed; sources of the data; relevance of the data to the practice-focused questions; and the process for analysis and synthesis of the data will be identified and outlined.

### **Practice-Focused Project and Evaluation Questions**

In response to an identified gap in COPD care practices in south-central Idaho, a PR program was developed and implemented by a local hospital in January of 2017. However, evidence of persistent gaps in COPD care practices and the recurring threat of penalties for excess COPD readmissions with subsequent reductions in CMS payments, led to the proposal of a quality improvement evaluation of the PR program. During several roundtable meetings, oral communications and phone conferences, the project team examined the structure, process and outcomes aspects of the program to determine how the evaluation project would be developed and what the practice-focused and evaluation questions should be. The team of experts agreed that the current PR facilities, program organization, and staff qualifications were consistent with the standards established by the AACVPR and that no deficiencies in the structure were apparent. Examination of the process and outcomes of the program resulted in the identification of deficiencies and the subsequent development of the practice-focused guiding question as well as one process-specific and two outcome-specific evaluation questions. The

practice-focused project question that guided this evaluation project was as follows: What impact has the PR program had on the care provided to individuals with COPD south-central Idaho? The evaluation questions used to answer the project question were as follows:

1. Is the current PR program being adequately used? (process)
2. Do patient specific program outcomes indicate improvements in functional capacity in those with COPD who participate in PR? (outcome)
3. Has there been a reduction in the number of COPD readmissions at the hospital since implementation of the PR program? (outcome)

Examination of the number of referrals to PR generated at discharge for those admitted for COPD exacerbation was used to answer the first evaluation question. The current guidelines indicate that 100% of patients admitted to the hospital for exacerbation of COPD should be referred to and start PR within 6 weeks of discharge, and participation should last a minimum of 10 weeks for maximal benefit to be realized (GOLD, 2020). Any percentage less than 100 for referral rate or completion of less than 10 weeks of PR after initiation is consistent with poor use and uptake of PR and will be identified as an area for improvement.

Functional capacity is defined as “the capability of performing tasks and activities that people find necessary or desirable in their lives” (Encyclopedia of Public Health, 2020). In PR, functional capacity refers to an ability to perform activities of daily living (ADLs) without limitation from dyspnea. It is measured through collection and comparison of objective and subjective pre- and post-program participation measures,

including maximum metabolic equivalents (Max METS [objective]), Get Up and Go scores (objective) and patient reported change in strength, endurance and balance (subjective), as outlined by the AACVPR (2011). These measures have been established as valid and reliable measures of functional capacity in those with COPD (Daabis, Hassan & Zidan, 2017; Demeyer, et al., 2014; Hakamy, Bolton & McKeever, 2017; Jette, Sidney & Blumchen, 1990). Only data from those patients completing a minimum of 10 weeks of PR were used to complete this project as a means for decreasing intrinsic limitations of the data and ensuring reliability of the findings.

### **Sources of Evidence**

This project involved a multifaceted evaluation of the PR program's impact on COPD care, thus, multiple sources of evidence were used. In 1998, the Global Initiative for Chronic Obstructive Lung Disease program was initiated with the goal of standardizing COPD care through publication of clinical practice guidelines. Their first report, *A Global Strategy for Diagnosis, Management and Prevention of COPD*, was published in 2001. In 2002, the GOLD science committee was established and tasked with reviewing newly published research surrounding the management and prevention of COPD, determining the impact of this research on the recommendations in the GOLD report and posting yearly updates on the GOLD website. The committee meets twice a year to discuss new research studies and decide whether they should be included in the annual update. In response to significant changes in the published literature, major revisions were made to the GOLD report in 2006, 2011 and 2017. The American Thoracic Society has also published clinical practice guidelines for COPD care, however

their reports focus solely on the prevention and management of COPD exacerbation. The GOLD report remains the only published report to include practice guidelines for the diagnosis, management and prevention of COPD. In addition to the GOLD report and ATS guidelines, guidelines established by the American Association of Cardiovascular and Pulmonary Rehabilitation, whose purpose is to ensure optimal care is provided to all PR patients, were used to complete the project.

The data used for this project consisted of archival and operational data that is continually collected and tracked by the hospital through use of electronic medical records systems implemented in October of 2016, and by the PR program since opening in January of 2017. More specifically, the data used to complete this project included: the number of individuals with COPD who have been referred to the PR program; the number of individuals referred to PR who completed at least 10 weeks of the program; the patient-specific pre and post-program participation objective and subjective outcome measures of max Mets, Get Up and Go scores, and patient reported change in strength, endurance and balance; and the total number of hospital readmissions for COPD before and after implementation of the PR program. Use of this specific data set allowed each of the project's practice-focused questions to be answered. The validity and reliability of secondary data extracted from the EMR systems was ensured by use of guidelines for EMR use set forth by CMS, the National Institute for Health and the Agency for Healthcare Research and Quality (AHRQ, 2019). There were no inherent limitations to secondary data collected from the hospital EMR system as it is all driven by diagnosis code, but the patient-specific pre and post-outcome measurement data is limited by the

simple fact that post-program participation outcome measurements is collected at different points on the timeline. For example, some insurance carriers will only cover 24 sessions of PR so post-participation data would be completed after 12 weeks, where other insurance providers will cover 36 sessions so post-participation data was collected after 18 weeks. Permission to use the data needed to complete the project was granted by the hospital nursing research office with the stipulation that no raw data be collected by the DNP student. All data was extracted from the EMR by a data analyst employed by the hospital and the director of the PR program.

### **Analysis and Synthesis**

The hospital and all outpatient clinics moved to the Epic electronic health records system in October of 2016. The Epic EHR system integrates a clinical component in which clinicians can document and a billing and coding component which facilitates data tracking and extraction. Prior to 2016, inpatient data was documented and tracked in the Meditek EMR system, outpatient data was documented and tracked in the Centricity EMR system and readmissions data was tracked through use of a program designed by WhiteCloud Analytics, an independent healthcare performance management company whose platform was designed to help health systems optimize care, improve financial health and streamline operational efficiency.

De-identified data was collected from both the PR program and the hospital. The number of referrals to the PR program and the number of hospital readmissions for COPD exacerbation before and after implementation of the PR program was obtained from an information analyst employed by the hospital. This data was then compared to

national goals. This data analysis was used to answer the evaluation questions, Is the current PR program being adequately used and Has there been a reduction in the number of COPD readmissions at the hospital since implementation of the PR program? Program specific objective and subjective pre and post-PR participation data was compiled in an Excel worksheet and provided for use in completion of the project by the director of the PR program. The patient-centered objective measures that examined were max Mets and Get Up and Go scores, and the subjective measures included patient reported change in strength, endurance and balance. This data was only compared to program-specific pre-identified goals as outlined by the AACVPR guidelines and was used to answer the evaluation question, Do program outcomes indicate improvements in the overall functional state in those with COPD who participate in PR? SPSS software was used for statistical analysis of the data.

When answering the first evaluation question, Is the PR program being adequately used, the numbers of patients admitted to the hospital for COPD exacerbation, the percent referred to the PR program at discharge and the percent of patients who completed a minimum of 10 weeks of PR to date were summarized and described. To answer the second evaluation question, Do patient specific program outcomes indicate improvements in functional capacity in those with COPD who participate in PR, pre and post-participant data was compared using Chi-Square for the objective measures of Max METS and Get Up and Go Score and binomial tests for the subjective measures of strength, endurance & balance. To answer the third evaluation question, Has there been a reduction in the number of COPD readmissions since implementation of the PR program, the percentage

of change between pre and post-program implementation readmissions numbers was calculated to determine clinical impact. Because only cumulative numbers will be provided, as opposed to individual patient data, a formal statistical analysis of between-subject variability is not possible within the scope of this project.

### **Summary**

COPD is associated with significant morbidity, personal, social and economic burdens and is now the third leading cause of death in the United States. There are numerous pharmacological and non-pharmacological interventions proven to be of benefit for those with COPD. However, full implementation of these interventions requires a collaborative effort between the interdisciplinary healthcare team, the patient and the patient's family/caregiver. Participation in a PR program has been shown to be the single most effect non-pharmacological intervention for improving both functional capacity and quality of life in those with COPD and therefore efforts to increase use and uptake of PR have the potential to effect significant positive social change (Amalakuhan & Adams, 2015). Completion of this project is the first step in a local effort to improve care for patients with COPD. Now that the problem-focused questions have been reviewed, the sources of evidence for the project and the methods for analysis and synthesis of the data have been reviewed, the next section of the paper will discuss the findings of the project, explain any areas identified as opportunities for improvement and summarize the recommendations of the project team for dissemination of the findings.

## Section 4: Findings and Recommendations

### **Introduction**

COPD continues to be one of the major causes of morbidity and mortality worldwide, despite significant advances in understanding and treating the disease. The unstable course of the disease, with unpredictable periods of exacerbation affecting its natural course, makes COPD a formidable health challenge (Sahin et al., 2016). An exacerbation of COPD is defined as a sustained worsening of symptoms requiring additional treatment and/or hospitalization (Pavord, Jones, Burgel, & Rabe, 2016). Frequent exacerbations accelerate decline in lung function, negatively impact a patient's quality of life, and are associated with higher rates of mortality; the single best predictor of exacerbations is a previous exacerbation (Thomsen et al., 2013). As the most common reason for hospitalization in those with COPD, exacerbations have a profound and lasting effect, making prevention of exacerbation a priority (Ryrso et al., 2018).

Although primarily a pulmonary condition, the systemic effects of COPD include loss of skeletal muscle mass and function - a known major cause of muscle weakness and poor exercise tolerance. Atrophy of skeletal muscle has been clearly identified as a negative prognostic factor and loss of quadriceps strength has been shown to increase mortality risk in those with COPD (Alfarroba et al., 2016). An abundance of literature demonstrating PR's effectiveness in increasing exercise tolerance and patient-reported quality of life, as well as reducing dyspnea, rate of exacerbation requiring hospitalization, and duration of hospitalization for exacerbation currently exists (Holland & Hill, 2011). Despite the resounding support for use of PR in any effort aimed at reducing the rate of

COPD exacerbation and related hospital admissions, PR continues to be grossly under-used throughout the United States (Early et al., 2018).

The discovery of potential misalignment with current practice guidelines for COPD care at a hospital in south-central Idaho served as the impetus for this evaluation project. The purpose of the project was to address the identified gap between current practice guidelines for PR use in the care of patients with COPD and the actual care being provided to patients south-central Idaho. The guiding practice-focused question for the project was: What impact has implementation of a PR program in south-central Idaho had on COPD care? The evaluation questions developed by an interdisciplinary team led by the DNP student were as follows:

1. Is the current PR program being adequately used?
2. Do program outcomes indicate improvements in the overall functional capacity in those with COPD who participate?
3. Has there been a reduction in the number of COPD readmissions at the hospital since implementation of the PR program?

In order to address all the facets of this evaluation project, multiple sources of evidence were required including: (a) current clinical practice guidelines established by the Global Initiative for Chronic Obstructive Lung Disease, the American Thoracic Society and the American Association of Cardiovascular and Pulmonary Rehabilitation; (b) literature evaluating current COPD care practices and the role of PR in COPD care; and (c) the national standard for rate of COPD readmissions established by the Centers for Medicare and Medicaid Services.

## Findings and Implications

### Evaluation question #1

During the project evaluation period a total of 411 patients were referred to the PR program upon discharge from the hospital, but only 59 (14%) completed the PR program. For the purposes of this study, program completion was based on current guideline recommendations and defined as completing a minimum of 10 weeks or 20 sessions of PR. The mean age for participants who completed the program was 70.88 (range: 42-90). An additional 40 patients enrolled in PR but, for various reasons, were unable to complete the full 10 weeks or 20 sessions required to be included in the project data. Since the PR program opened its doors in January of 2017 the pulmonary rehab clinic has had a total of 2862 visits and referral orders to the program at hospital discharge have increased from 22% in 2017 to 44% in 2019. This difference represents a statistically significant change in use ( $\chi^2 = 10.78$ ,  $p = .0001$ ). However, the current guidelines suggest that 100% of patients admitted to the hospital for COPD exacerbation should be referred to PR at discharge, should begin PR within 6 weeks of discharge and should complete a minimum of 10 weeks or 20 sessions of PR for maximal benefit to be realized (ATS/ERS, 2015; GOLD, 2020). Therefore, while the rate of referral to PR after hospital discharge did increase significantly during the evaluation period (22%), the referral and completion rates of 44% and 14% respectively are still well below the guideline recommendations and represent persistent under-use of the PR program.

## Evaluation question #2

A total of 21 women and 38 men completed the recommended 10 weeks/20 sessions of PR. Chi-square was used to test the difference in their pre and post distributions of Max Mets and Get Up and Go Scores with a significant change noted over the course of the program ( $[t(51) = 7.25, p < 0.0001]$  and  $[t(57) = 6.97, p < 0.0001]$  respectively). Means and variables are shown in Tables 1 and 2.

Table 1

### *Max Mets*

Max Mets	Pre	Post
Mean	1.954615385	2.480192308
Variance	0.136260633	0.307233296
Observations	52	52

Table 2

### *Get Up and Go Scores*

Get Up and Go	Pre	Post
Mean	10.46	7.975
Variance	20.78310877	13.86774825
Observations	58	58

Binomial tests were used to test the probability of positive responses (i.e., perceived improvement in strength, endurance and balance) over negative responses (i.e., no perceived improvement) being greater than chance. The binomial test determines the probability of a particular outcome (i.e., positive response) across a certain number of trials where there are precisely two possible outcomes. For all three of the subjective measures examined, the likelihood of patients reporting improvement due to PR participation was significantly greater than chance (Table 3). These findings indicate

completing the recommended 10 weeks of PR does result in improved overall functional capacity.

Table 3

*Patient Reported Subjective Measures*

	Patients reporting improvement	Patients reporting no improvement	Calculated probability of reported improvement $\geq 0.05$ (chance)
Strength	57	1	<0.0001
Endurance	53	5	<0.0001
Balance	45	13	<0.0001

**Evaluation question #3**

During the three months prior to PR implementation (10/1/16 – 1/30/17), there were a total of 95 COPD admissions and 4 readmissions which equates to a readmissions rate of 4.21%. During the evaluation period (2/1/17 – 12/31/19) there were a total of 1000 COPD admissions and 69 readmissions which equates to a readmission rate of 6.9%. When comparing the readmission rates for these two periods it appears that the hospital readmission rate for COPD actually increased after implementation of the PR program however, lack of access to more than three months of readmission data prior to implementation of the PR program due to installation of an electronic medical records system just prior to the go-live date for the PR program, precludes a true comparison of readmission rates pre and post-PR implementation. Simmering et al. (2016) explained that, in the United States, 10–20% of those admitted with COPD are readmitted within 30 days of discharge, therefore the hospital's 6.9% rate of COPD readmission is well below the national average.

Changes in the hospital quality improvement staff during the course of the project, the length of time required to obtain the hospital de-identified data and the need to further refine and clarify the data resulted in unexpected delays in completing the project, but these delays did not impact the outcomes of the project. The inability to access more than three months of readmissions data prior to implementation of the PR program was an unexpected limitation of the project, making a full comparison of readmission rates before and after implementation of the PR program impossible, but this also did not impact the outcomes of the project in any meaningful way. An unexpected discovery of the project was the extremely small number of people who were referred and completed the PR program. During the evaluation period a total of 411 referrals to PR at discharge from the hospital were made, but only 59 people (14%) completed a minimum of 10 weeks or 20 sessions. This leaves 352 (86%) who were referred, but either never started or just did not complete the program. Despite the unexpected delays and limitations of the project, the results of this quality improvement evaluation project still carry significant implications for all the stakeholders. Project results confirm that the PR program, shown to effectively improve objective and subjective measures of functional capacity for those with COPD who participate, is under-used. Improving the use of the program has the potential to impart positive social change through improving care provided to those with COPD south-central Idaho and decreasing the associated healthcare costs of the disease through decreased rates of exacerbations requiring hospitalization.

## **Recommendations**

This evaluation project confirmed that, despite an ability to improve functional capacity and reduce the rate of COPD exacerbations requiring hospitalization, the PR program is currently being under-used. This project was the first attempt at evaluating the potential impact of PR on COPD care in south-central Idaho and no other evaluation projects examining the PR program have been proposed or are currently underway. Recommendations based on the results of the project are that efforts aimed at improving both use and uptake of the PR program be developed and implemented.

## **Contribution of the Project Team**

Creating an interdisciplinary team with the right mix of expertise and skill is vital to the successful completion of a project. While some members of the project team served in more of a subject matter expert and supervisory role, the contributions of others were integral to completion of the project. Without the assistance of the PR program director a complete understanding of PR, from referral to program completion would not be possible nor would selection of the most appropriate evaluation criteria or compilation of the pre and post-participant data. The director of the Nursing Research department helped to refine the project goal, evaluation questions and complete the statistical analysis of the data supplied by the hospital analyst and PR program director. There are no plans at this time to extend the project beyond what was done as part of this doctoral project.

### **Strengths and Limitations of the Project**

A more extensive evaluation of pre and post-participation outcome measures as well as examination of factors contributing to referral and uptake of PR was originally planned, however a more narrow scope of evaluation was required to meet the hospital's criteria for non-research projects and the time and resources available for project completion. Recommendations for any future projects addressing similar topics and using similar methods include making sure to assemble an interdisciplinary team with complimentary skills/experience and a similar motivation for project completion, and developing a time line with sufficient time built in to account for the required turn-around time for data acquisition and analysis.

## Section 5: Dissemination Plan and Self-Analysis

### **Dissemination Plan**

Dissemination, in a healthcare context, is defined as a targeted distribution of information to a specific audience with the intent of spreading knowledge and increasing the evidence base for clinical practice. Goals of dissemination include increasing: (a) the reach of the evidence, (b) the motivation of those in the audience to use the evidence and (c) the ability of those in the audience to apply the evidence in practice (Agency for Healthcare Research and Quality, 2012). For this project the immediate intended audience will be the project stakeholders. A variety of methods will be used to disseminate the project findings and recommendations. Poster presentations will be used to visually summarize the findings for dissemination. These posters will be augmented with a Power Point slide and oral presentation and the project findings will be presented at both the local (PR clinic) and system levels (quarterly COPD meeting). At this time there are no plans to disseminate the evidence beyond the stakeholders identified for the project, but appropriate audiences and venues for dissemination to the broader nursing profession would include presentation of the project findings at the state and national APRN conferences as well as the national COPD conference.

### **Analysis of Self**

Sherrod & Goda (2016) explained that DNP-prepared nurses possess knowledge and skill to positively affect patient and population outcomes, improve quality, safety and satisfaction through application of research evidence and use of translational science.

Despite being a Nurse Practitioner for 10 year, prior to enrolling in the DNP program at Walden and completing this project, I was not especially comfortable assuming leadership roles. I feel I was a competent clinician especially good at educating patients and their families, engaging them in their care and providing evidence-based care however, when it came to decisions on a larger scale (i.e. why the hospital's policy was this or that or why this or that wasn't covered by insurance), or using the evidence to encourage change outside of my own practice, my attitude and actions could often be characterized as complacent. This project helped me to understand that through interprofessional collaboration, shared decision making and leadership, change that positively impacts patient outcomes, is possible. There were a few hurdles along the way in completing the project, including some unexpected health crises with family members and the unexpected length of turn around required for some of the project steps but, this is not the first time I have faced adversity in all of my years of education, so I feel these hurdles only served to strengthen my resolve to not only complete the project but for it to be a project that I could be proud of and that would benefit the organization I work for. Recently I relocated to a new town but was fortunate enough to remain employed by the same hospital organization as a pulmonary nurse practitioner. With a newfound confidence in my leadership and agent of change abilities I have easily identified and moved into several developing opportunities for healthcare improvement initiatives and look forward to many years of playing a leading role in improving the quality of healthcare at the local, regional and maybe even national level.

## Summary

DNP capstone project is an umbrella term used to describe a scholarly project whose express purpose is to translate evidence into practice. The focus of the project should reflect an area of specialization or interest and the finished project should demonstrate an ability to lead and practice at the highest level of clinical nursing practice. While this project, focused on improving care for those with COPD in south-central Idaho, demonstrates the essential components of a successful capstone project and illustrates the potential for a single quality improvement initiative to positively impact care for those with COPD in south-central Idaho, it also identified other potential gaps in practice COPD and illuminated the need for additional projects in the near future with the aim of continued improvements in COPD care in south-central Idaho.

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