2019

Incentive Size Alignment with Accountable Care Organization Performance

Kristie D. Racca
Walden University

Walden University

College of Health Sciences

This is to certify that the doctoral dissertation by

Kristie D. Racca

has been found to be complete and satisfactory in all respects,
and that any and all revisions required by
the review committee have been made.

Review Committee
Dr. Michael Furukawa, Committee Chairperson, Health Services Faculty
Dr. Terika Haynes, Committee Member, Health Services Faculty
Dr. Fred Tabung, University Reviewer, Health Services Faculty

Chief Academic Officer
Eric Riedel, Ph.D.

Walden University
2019

Abstract

Incentive Size Alignment with Accountable Care Organization Performance

by

Kristie D. Racca

MA, Florida International University, 2001

BS, Florida International University, 1998

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Philosophy

Public Health Policy and Health Services

Walden University

March 2019

Abstract

Changes to the country's health care political landscape in 2012 resulted in the development of federal programs aimed at containing costs and improving the quality of care delivered. Accountable Care Organizations (ACO) emerged linking performance to rewards. Guided by Conrad's value-based performance incentive theory as the theoretical foundation, the purpose of this quantitative study was to determine the relationship between financial incentive size and ACO performance measures. The research questions examined the predictive relationship of incentive size and acute care readmission rates, emergency department (ED) visits, and per capita spending of the ACO Medicare Shared Savings Program population. The study included 348 participating ACOs serving 7.8 million Medicare enrollees. Secondary archival data were analyzed using multiple linear regression models to test the relationship patterns of the three dependent variables. The findings showed a significant association between incentive size and acute readmission rates $\beta = .001$; 95% CI, .000185, .001342; $p = .010$; and a significant inverse association with per capita spending, $\beta = -6.28E^{-7}$; 95% CI, -.000001, $-1.61E^{-7}$; $p = .009$, but no association with the frequency of ED visits $\beta = -5.06E^{-6}$; 95% CI, -.000011, $7.04E^{-7}$; $p = .085$. The study results support that incentive size is linked with higher acute care readmission rate and lower per capita spending but not frequency of ED visits. Incentive size was found to be associated with better and worse ACO provider performance depending on the outcome. Social change implications include improved performance on ACO spending, which might potentially lead to political and regulatory changes supporting larger financial incentives by the federal government.

Incentive Size Alignment with Accountable Care Organization Performance

by

Kristie D. Racca

MA, Florida International University, 2001

BS, Florida International University, 1998

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Philosophy

Public Health Policy and Health Services

Walden University

February 2019

Dedication

In 1995 I was 23 years old and lost you forever. It has been a lifetime since you've been gone and you continue to drive my motivation, reinforce my inner strength and encourage my every goal in life. Thank you Dad, Jack Alan Skipper, for being you. You are loved and missed every day. I did this in your memory.

Acknowledgments

Thank you to the men in my life, Roland my Husband and rock, to my Sons Jack and Riley my little men for believing in me. Jack and Riley I hope you reach all your goals in life, never stop reaching for the stars. You all gave me comfort, assurance, and support to accomplish my goals. Roland, I thank you for building my "quiet place" and for 21 years of encouragement. I did this for you…for us.

To my Mother, Brenda Maria Labaton and Grandmother, Eva Maria Rodriguez, thank you for catching me when I fell as a little girl and in life. Even when my mind wandered I always had a safe place to go. Thanks to you I carry the strength and confidence of a successful woman in heart, mind, and soul. I gave more because you gave it all. I did this for you, Mom, and in your memory Nana.

Thank you to my most recent supporter and believer Dr. Furukawa. The road was long and paved with grammatical challenges I overcame with his help. I never lacked passion; it has been technically difficult journey, which is exactly what Dr. Furukawa guided me through. Thank you Dr. John Rose, the man that planted the PhD seed in my head. Many thanks to the few people I had in my corner.

Table of Contents

List of Tables

List of Figures

Chapter 1: Introduction

Introduction

The Affordable Care Act (ACA) is the comprehensive health care reform law passed in March 2010 (Centers for Medicare and Medicaid Services, n.d.). The ACA had three goals: to provide affordable health insurance to more people, expand the Medicaid program, and support innovative medical care delivery to lower the costs of health care (CMS, n.d.). With the passing of the ACA, the payment structure in the delivery of health care evolved, and alternative payment models (APMs) surfaced as a result. One goal of the APMs is to improve the quality of care through the use of financial incentives as a method to influence and motivate health care providers and organizations (Centers for Medicare and Medicaid [CMS], 2015). APMs are a mechanism to improve ACO performance, focusing on improved quality of care, controlled resource spending or utilization, and improved population health through a team approach of treatment and services (CMS, 2017). APMs support universal quality, standardized, clinical decision-making, increasing the likelihood of continuity of services and improving collaboratively-delivered comprehensive care (DeCamp et al., 2014; Salisbury-Afshar, 2012).

These models were first applied to Accountable Care Organizations (ACOs) through CMS in 2012. ACOs are groups of doctors, hospitals, and other health care providers who voluntarily come together to provide quality care to Medicare patients through a collaboration of provider care (CMS, 2017a). These programs focus on quality and cost-effective health care to this often-vulnerable Medicare population (CMS,

2017a). Financial incentives were implemented under the ACA as a means to motivate and to guide provider treatment behavior with regard to the employment and analysis of care delivery (CMS, 2015b; CMS, 2017a). The impact of financial incentives on provider behavior lacks quantitative support (Khullar et al., 2015; Peterson, Woodard, Urech, Daw, & Sookman, 2006; Salisbury-Afshar, 2012; Werner et al., 2011). Revising the financial incentive size may initiate changes in a practitioner's medical decision-making processes, which could, in turn, lead to improved quality, coordinated care, efficient resource usage, and cost containment or savings (Khullar et al. 2015).

Systematic predictions supported by behavioral economics imply that provider treatment behavior and medical decision-making potentially contribute to the quality of care and the provider's/organization's performance is dependent on various provider-specific factors (Conrad, 2015; Conrad & Perry, 2009). Characteristics applied by behavioral economics, show a variety of factors contributing to the behavior of the incentive (Conrad, 2015). For example, the financial incentive success is impacted by distribution delays in payment, the frequency of incentive paid out, the incentive size or how it is delegated to ACO administration and providers, and which quality measures are utilized to determine the incentive specifically; all leading to the question if quality measures of care are a direct result of provider behavior as opposed to consumer behavior (Khullar et al, 2015). Khullar et al. (2015) indicated that incentives with smaller more frequent payments are more motivating than a lump sum. Health care providers adapt a personal medical decision-making process when approaching patient care. This variable is defined as the differences in provider errors linked to medical decision-making and are

commonly referred to as performance risks in the field (Conrad, 2015). These clinical processes link the diversity in medical training experience and exposure to multiple conditions or clinical situations. Providers can be motivated uniquely, the incentive size is a single, quantitative component, while what motivates a person is based on a number of personal preferences and perspectives (Khullar et al., 2015). Default knowledge of providers relies on their individually unique education experiences; varying factors include the diversity in instructors to the distractions of life, individually alternating a subjective use of clinical processes of care lacking uniformity and universal quality of care (Conrad, 2015).

The individual provider's ethical decision-making approach links the physician's residency training environment, intellectual diversity, personal motivation triggers, diversity in the quality of education of ranked medical schools, and personal ethics; these further contribute to the discrepancy in the delivery of quality care (Conrad, 2016; Conrad & Perry, 2009). Aligning provider performance with a sufficient financial incentive size will support and enhance quality of care improving the country's health, health care spending, and utilization trends in the United States (Conrad, 2016).

In this study, I highlighted the alignment of financial incentive size and provider decision-making behaviors in an ACO-contracted setting. ACOs have three APM options for organizations that choose to participate in the federal delivery program (CMS, 2017a). In this study, I focused on the Medicare Shared Savings Program, financial incentive size, and ACO performance impact of the federal delivery program.

Medicare recipients are considered to be "at risk" for receiving poor quality of

medical care (Gu et al., 2014). The social change implications for this research include potentially improving the quality of health care delivered to an estimated 57 million people enrolled in Medicare (Social Security Administration, 2016). Improving the quality of care and reducing health expenditures for Medicare recipients will ultimately improve their health care experience. This is accomplished by utilizing more efficient financial incentives and contractually implementing universal clinical quality standards of provider treatment behavior at the primary care level. There is a fundamental need for universal quality care and universal standard defaults contractually mandated to assist in the redevelopment of the existing health care delivery and reimbursement system supported by the value-based payment incentive theory (VBPIT) framework of the study. This model should balance the coordination of ACO structural operative change, through defined and legally binding expectations of universal clinical quality standards utilizing APMs inclusive of programs developed by CMS to potentially support application of this strategy into the private insurance sector, expanding federal regulation of insurance standards and accountability.

In Chapter 2, I will discuss the supporting literature and background on the use of CMS-quality formulated programs, cost-effective measures delivering value-based incentives, the Medicare population, and the reformation of health care strategies to contain costs while improving quality and promoting healthy outcomes with meaningful incentive models and metrics. The purpose of this research was to determine the relationships that address the unreliable quality in the delivery of care within the United States. In this study, I examined the relationships between the Medicare Shared Savings

Program (MSSP) incentive size and ACO performance on acute care readmissions, outpatient emergency department visits, and per capita total performance year spending. With this study, I also intended to identify and determine the nature of the relationship between financial incentive size and ACO performance. Once developed, the research questions and hypotheses shaped the study design through the lens of the VBPIT. Using a cross-sectional correlational design, interactions between variables were examined through linear regression models. These models were used to determine whether a predictive relationship exists between the independent variable and dependent variables.

Background

The ACA of 2010 was the political window of opportunity to realign the complex and uncoordinated U.S. health care delivery system with one that is responsive to the meaningful use of financial incentives delivered through ACOs. The goal of the Department of Health and Human Services (DHHS) was aggressive because the nation's health delivery system transitioned from volume to value-based incentive formats (CMS, 2015). Thus, the CMS constructed an ACO approach utilizing a reformed payment model that is inclusive of a financial incentive component for participating as MSSP organizations (CMS, 2015). In this study, I scrutinized the potential predictive relationship of the MSSP incentive size on acute readmissions rates and the frequency of emergency department (ED) visits not resulting in a hospital admission, both expensive services are avoidable through comprehensive and responsive preventative primary care at the ACO level, working collaboratively to improve the continuity of care and reduce wasted or unneeded expenses.

The goal of CMS is to transition 90% of existing fee-for-service payment arrangements into value-based payments by 2018, holding health care organizations accountable for quality and conjoining points of care and service coordination through the contracted use of CMS benchmarks supporting alternative payment models (Burwell, 2015). The Medicare Access and CHIP Reauthorization Act of June 2015 (MACRA) was a catalyst to produce greater quality and comprehensive health care and is expected to be a spending containment mechanism to develop smaller, more manageable populations (Arnold, 2016). The organizational and economic shift follows an alternative payment model using bundled or episode-based payments and incentives to improve the alignment of the structural operations within ACOs (Vogus & Singer, 2016).

Typically, incentives have focused on influencing patient behavior to improve health outcomes, with a distinctive gap in the literature on the provider's performance motivated by the size of the financial incentive of the MSSP (Khullar et al., 2015). Several gaps in the literature exist around the association between incentive size and the performance of an ACO. Gaps include the available literature on payment model success and the successful ACO operational structure sustained by incentive size. The incentive size of the reward influences provider behavior, while contributing to the knowledge of decision-making processes that yield the most improved health outcomes and related cost savings per member of the ACO targeted population (Kronick, Casalino, & Bindman, 2015; Peterson et al., 2006). There is no existing literature in which a researcher or researchers questioned or studied the relationship between the absolute incentive sizes, measured by the cumulative potential dollars saved, on organizational performance. In

most extant studies, researchers assessed the performance of ACOs with limited attention to incentive size and primarily a focus on percentages to show savings (Layton & Ryan, 2015; McWilliams, Landon, & Chernew, 2013).

The literature surrounding the scope of this study includes various approaches when delivering quality health care. Research has been sparse regarding the concept of cost-effective measures that produce increased quality of care by applying a value-based incentive strategy (Bardach et al., 2013). Researchers have concentrated on financial incentives that impact the quality of health care, provider behavior that contributes to the alignment of medical decision-making, and the incentive size that influences positive change. Bardach et al. (2013) also suggested that quality-formulated incentive models are efficient when incentives are designed to pay bonuses at the physician level. Financial incentives are particularly useful in research that focused on people defined as "difficult to treat" or those with elevated health risks due to chronic conditions, both are characteristics of the Medicare population (Bardach et al., 2013). Financial incentives are used to encourage providers to deliver comprehensive care while reinforcing healthy patient behavior through education and appropriate medical decision-making (Comfort, Shortell, Rodriguez, & Colla, 2018; Khullar, 2015; McWilliams et al., 2013). Financial incentives are an instrument to encourage systemic change to the nation's health care delivery system by supporting changes to health policy and provider-specific motivational incentives attached to intrinsic and extrinsic incentive rewards (McWilliams et al., 2013).

The literature has also supported the use of an appropriate design of financial

incentive payment schemes. Prior to Conrad's (2015) development of the VBPIT, there lacked a theoretical or conceptual framework to guide research focused on influencing provider motivation and behavior, presenting as a limitation of the design (Scott, Liu, & Yong, 2016). Scott et al. (2016) also performed an empirical article review applying the APM framework in their study aimed at cost and quality of value-based purchasing in the health care industry with a synopsis of design features.

McWilliams et al. (2013) found a relationship between alternative quality contracts and reduced spending on Medicare participants and revealed a sporadic and deficient consistency of quality delivered care. By rewarding participating providers through global payment incentives contractually designed to produce improved quality and reduced spending through behavioral changes leading to more efficient processes, provider performance is optimized by refining their clinical decision-making influenced by effective incentive size (McWilliams, 2013). Researchers have suggested that larger incentive rewards will reduce the customary fee-for-service spending and under- or overtreatment utilization patterns currently occurring (McWilliams, Chernew, Landon & Schwartz, 2015). Shortcomings in the existing fee-for-service reimbursement model are its misuse in the utilization of services that rewards for volume of services and cost containment of care (Burwell, 2015). Overuse of services results in inflated spending and unnecessary medical services, while underuse of services suggests and encourages providers to withhold care or deny a service that is needed (Epstein et al., 2014).

Torchiana et al. (2013) showed that small incentive amounts, identified as 2% of the physician income, failed to alter medical decision-making behavior of the provider.

Empirical findings also indicated a need to align quality metrics and incentive payment program models to generate valid results (Torchiana et al., 2013). Therefore, financial incentives may influence provider behavior but also contribute successful incentives to other structural characteristics of the incentive and not the size. Torchiana et al. (2013) evaluated the predictability of incentive size with regard to an absolute dollar amount and not a percentage of revenue on provider behavior in an ACO environment, analyzing readmission rates, ED frequency, and per capita expenditures.

There is a need to describe how bonus payments are processed and structured in provider groups in order to link health outcomes to a particular data element reported by ACOs (Salisbury-Afshar, 2012). Salisbury-Afshar's (2012) findings supported alignment of per capita figures to meaningful incentive models and metrics effective at improving quality and health status of the ACO subpopulation. Salisbury-Afshar's analysis also yielded insufficient statistical data that incentives produce improved quality at the primary care level. Of the 80 empirical studies reviewed in Scott et al. (2016) research, no relationship was found between financial incentive size and the percentage of positive health outcomes. In no other study was the dollar amounts of financial incentives evaluated, only percentage values have been assessed. Limited empirical studies exist on the examination of incentive size in a single program, and positive health outcomes inclusive of this research are a reduction in ED visits and acute care readmissions (Werner, Kolstad, Stuart, & Polsky, 2011). These reductions imply that more effective service and treatment utilizations at the primary care level are circumventing expenses, lowering the overall expenditures or per capita expenses of Medicare recipients.

In Chapter 2, I will discuss how the linking of ACO performance and provider decision-making as a mechanism to improve patient health outcomes has not been applied to APMs for financial incentive research. There are several mainstream gaps of knowledge: Of the 80 empirical studies reviewed by Scott et al. (2016), incentive size was not associated with having a predictive relationship with quality. This finding supports a successfully reformed payment model or ACO operational structure with the use of a balanced and aligned incentive size (Khullar et al., 2015; Peterson et al., 2006; Werner, 2012). Balanced and aligned incentives offer an opportunity to identify a successful link between external incentives with the intrinsic motivation of the providers (Kao, 2015). The results of this study provide valuable insight into the evolution of the U.S. health delivery system, primarily, the potential to craft health policies supporting the use of contractual CMS APM programs by applying a defaulted universal quality standard to clinical procedures when delivering care endorsed by balanced and aligned financial incentives yielding enhanced quality and ACO performance. By crafting universally applied quality clinical standards supported by the contractual mutual interest of the principle agent component of the VBPIT, these measures ensure a universal standard of quality applied to the APMs utilizing behavioral economic defaults to develop regulatory standards of clinical processes of ACO-assigned recipients. This action will provide policy building potential to expand this contractual quality expectation to public and private insurance organizations.

Problem Statement

The new ACA of 2010 payment reform models recognized that balanced motivation between intrinsic and extrinsic factors is needed to construct an efficient provider incentive reward model. In recent years, there has been a shift from volume to value-based incentives that shape provider behavior (Burwell, 2015, Khullar et al., 2015). Prior to the ACA, the industry rewarded providers for quantity rather than quality, resulting in the inconsistent delivery of comprehensive health care services and an increase in related health care expenses. Incentive alignment and balance are related to provider medical decision-making and the weak alignment between financial incentives and intrinsic motivation also known as incentive neutrality (Kao, 2015). To address the problem, the ACA developed APMs, such as ACOs. These newly drafted APMs have presented a moderately robust incentive size regardless of the program model, which ranges from 2% to a mere 3.9% motivation tool, taking the place of fee-for-services reimbursement methods (CMS, 2017a). The DHHS goals are to tie 90% of traditional Medicare fee-for-service reimbursements to quality measures using APMs by 2018, further supporting integration and coordination of care defined as comprehensive (Burwell, 2015). With proper alignment of financial incentives, a refined strategy could potentially improve the efficiency of health care services, contain expenditures, and ensure the delivery of quality care. This behavioral economic problem lies in the balance of motivation of the provider through extrinsic and intrinsic rewards. Financial incentives serve as a powerful tool for the federal government to stimulate quality medical decision-making (Jha, 2013; Khullar et al., 2015; McWilliams et al., 2015; Torchiana et al., 2013).

The quality of care has grown routinely inconsistent in the delivery of comprehensive and coordinated care, fueled by deficiencies in uniformed provider medical decision-making. The U.S. health care delivery system requires a payment incentive structure that promotes the alignment of incentive size and ACO performance. The effectiveness of the CMS-formulated financial incentives continues to lack analytic and quantitative assessment, with no evidence of the optimal incentive size or design as producing the most efficient quality outcomes and implementation approaches (Peterson et al., 2006; Scott et al., 2016). Incentive size and strength is not a new concept, but its use among public health programs and ACOs is recent. However, little is known about its impact on the ACO's quality or provider's medical decision-making processes with regard to influence or noninfluence. The focus of this study was the weak alignment of financial incentives and provider medical decision-making behavior resulting in the ACO performance changes.

Berenson and Rice (2016) suggested that stronger intrinsic motivation is essential in policy building and recommended reconsideration of the role of the financial incentive in the APM used by the CMS in the ACO setting. Reformed ACO financial incentives have the potential to reward aligned decision-making by providers and administrators, offering a second option for assuming financial risk at a higher rate of return, eventually penalizing ACOs (Burwell, 2015). Prior research has demonstrated that applications of behavioral economics can increase the effects of financial incentives and enhance their outcomes, furthermore contributing to the balance of providers' personal intrinsic and extrinsic motivators (Khullar et al., 2015; Luft, 2015).

The MSSP provides an alternative payment methodology to improve ACO

performance by working collaboratively within and between networked provider specialties, facilities, and departments, producing a consistent and seamless delivery of health care services (CMS, 2016; Kessler et al., 2015). The MSSP provides the ACO with a risk-based option between two incentive reward-penalty tracks (Kessler et al., 2015). The MSSP requires a minimum of 5,000 participants in a fee-for-service payment arrangement that follows nationally-recognized quality measures outlined by the Agency for Health Research and Quality (AHRQ; Fingar & Washington, 2015). The AHRQ focuses on the patient's experience, care coordination and continuity, and preventative health care among at-risk populations (Kessler et al., 2015).

A comparison of the quality of care with CMS-produced benchmarks per the contracted period, under a risk adjustment model to calculate expected expenditures per Medicare recipient, determines whether or not a shared savings or loss occurs (CMS, 2015b). This risk adjustment is subject to shifting benchmarks with the use of a national growth rate to account for various health resource usage and linked expenditures per the recipient annually (CMS, 2015b). Each track provides an opportunity for the ACO to earn financial incentive rewards by placing risk and accountability on the ACO participating in either track with the appropriate balance of risk (CMS, 2105). Should the ACO quality standards meet the benchmarks, CMS will apply a sharing rate based on ACO performance per track model (CMS, 2015).

The prediction and potential impact of the MSSP are designed to encourage motivationally-aligned provider decision-making with balanced financial incentives, while enhancing and increasing the likelihood of continuity of care and improving

comprehensive care simultaneously (DeCamp et al., 2014; Salisbury-Afshar, 2012). A balanced reward system utilizes two dimensions of processes in management to craft a technical and a sociocultural balance (Werner, 2012). The supporting knowledge gap surrounds the ability of the incentive component of the reformed payment models to produce a strong organizational structure and incentive-balance. There is limited existing literature concerning whether a sufficient incentive size value would improve health care quality in an ACO setting. Currently, no peer-reviewed studies suggest a link between CMS-defined benchmarks and health outcomes and indicators of provider behavioral influences that impact ACO performance and quality (Salisbury-Afshar, 2012). The CMS benchmarks are the quality indicators deemed important in the review of quality of care, helping to universally measure delivered services and comprehensive care (CMS, 2017b; Salisbury-Afshar, 2012); these are the same measures of quality used in the CMS database applied to the research questions and statistical analysis in this study. There remains a gap in literature concerning the relationships between MSSP incentive size and ACO performance as they relate to health care resource spending and utilization of the participating member.

Purpose of the Study

The purpose of this cross-sectional study was to examine the predictive relationships between the MSSP incentive size and ACO performance on acute care readmissions, outpatient emergency room visits, and per capita total performance year spending. The results of this research could potentially identify essential mechanisms and formulas of success in the ACO operational structure with the use of aligned formatting

of the financial incentive size (see DeCamp et al., 2013).

Research Questions & Hypotheses

The main objective of this research was to determine whether the reformed alternative payment-incentive model of the ACA is effective and robust enough to influence ACO performance and provider treatment behaviors within ACOs contractually participating in the MSSP. I developed the following research questions and hypotheses to guide this study:

Research Question 1: How does the MSSP value-based incentive size relate to the ACOs' performance on acute care readmission rates?

$H_0$1: There is no statistical relationship between the incentive size of the MSSP and acute care readmission rates in an ACO setting.

$H_1$1: There is a statistical relationship between the incentive size of the MSSP and acute care readmission rates in an ACO setting.

Research Question 2: How does the MSSP value-based incentive size relate to the ACOs' performance on the frequency of ED visits that do not result in a hospital admission?

$H_0$2: There is no statistical relationship between the incentive size of the MSSP and ED visits in an ACO setting.

$H_1$2: There is a statistical relationship between the incentive size of the MSSP and ED visits in an ACO setting.

Research Question 3: What is the association between the MSSP value-based incentive size and the total performance year spending per ACO Medicare

beneficiaries?

$H_0$3: There is no statistical relationship between the incentive size of the MSSP and per capita expenditures in an ACO setting.

$H_1$3: There is a statistical relationship between the incentive size of the MSSP and per capita expenditures in an ACO setting.

I extracted secondary data online from the CMS from a publicly-accessible file containing ACO quality performance metrics inclusively documented on the archival database (see Frankfort-Nachmias, Nachmias & DeWaard, 2015). All hypothesized variables were represented in this single database. The ability to use ratio scaling contributes to the quantification of the theory and study outcomes (Frankfort-Nachmias et al., 2015).

Theoretical Framework

Theory of Value-Based Payment Incentives

The guiding framework that I used to assess the potential relationship between incentive size and ACO performance measures was the VBPIT, which merges concepts of behavioral economics and the principal-agent theories (see Conrad, 2015). Williams, Costa, Odunlami, and Mohammad (2008) drew attention to the need for a "…systematic evaluation of social and economic policies that might have health consequences" (p. 11). The VBPIT is used to identify motivationally-balanced incentives to improve care by applying a robust incentive value and contractually structured internal process to enhance the patient experience when there is the need to develop realistic quality benchmarks to reach improved health outcomes for the ACO subpopulation (see Conrad, 2015). Along

with the identification of incentive size value impact, the knowledge of how motivators influence behavior can be used to assist in customizing successful ACO processes.

The inconsistency of internal operations and structured processes of an ACO affects the provider's performance and quality of care received by MSSP beneficiaries. The VBPIT merges components of both the principal-agent and behavioral economic theories by strategically monitoring reward and penalty systems; the systems meant to align health service continuity, optimize care delivery, and induce motivationally-balanced provider medical decision-making as a cost savings measure (Conrad, 2015). The principal-agent theoretical component of the VBPIT introduces a controlled contractual arrangement between the principal (i.e., the individual receiving care) and the agent (i.e., the MSSP- contracted ACO), thereby delineating the logical alignment of shared interests (Conrad, 2015). According to the conceptual framework of the VBPIT, factors driving incentive strength include direct incentive effects on outcomes and behavior, cost coverage of operations, prospective and fixed incentive structure, and size of payment with duration and stability in the payment arrangement (Conrad, 2015).

The VBPIT applied to this study because the ACO MSSP uses a contractual agreement that ensures an economic relationship between the patient, or consumer of services, and the ACO providers. Theoretically, the financial incentive payment strategy supports the common interest shared by the principal and the agent (Conrad, 2015). In this study, I questioned the allure of the incentive size in a coordinated and comprehensive health delivery setting, coupled with the need to challenge control costs, a need which impacts both the principal and the agent. Conrad's (2015) theory responds to

the need for cost reduction in the delivery of services and places accountability and risk on the ACO and the providers involved in the coordination of care. The theory conceptually implies that value-based reimbursement structures, with properly-motivated providers, will deliver improved quality of care that will maximize both provider/ACO net income and health benefits for beneficiaries through competitive incentives, subsequently encouraging an industry shift from volume to the value of care (Conrad, 2015).

Behavioral Economics

Providers present a behavioral challenge because their motivators lie in a diverse range of intrinsic and extrinsic factors. Behavioral economics applied to contractually arranged incentives can theoretically enhance the effects of financial incentives, promoting an improved medical decision-making process through behavior expectations of the providers or agents (Conrad, 2015, Khullar et. al, 2015). The theory of behavioral economics suggests that encouraging incentives have characteristics of the behavior of the incentive (Conrad, 20115). These features include the timing of the incentive distribution; the frequency of payment; and the size of the stimulus or its delivery, if such delivery is more efficient when there are several smaller payments compared to a single annual bonus (Khullar et. al, 2015). Berenson and Rice (2015) suggested that behavioral economics argues that a financial incentive, regardless of size, has the potential to compromise the provider's intrinsic motivation. Researchers have strived for *incentive neutrality* in the provider's reward payment, as others have suggested incentive alignment

with those professional values and ethics held by the ACO provider and administration (Roland & Dudley, 2015).

Nature of the Study

In this research, I used a quantitative, cross-sectional, correlational design. I examined the relationships between incentive size and ACO performance on readmission frequency, ED visits, and per capita spending. The cross-sectional design allowed for the testing of whether incentive size is related to organizational performance for a large sample of ACOs participating in the MSSP. The goal of this study was to determine whether a predictive link exists between these validated metrics and the extent of the strength or weakness and the correlated positive or negative direction.

In this study, I used secondary data generated by the CMS. CMS collects performance data from all participating ACOs in the MSSP. These data are publicly accessible via their website via a public use file (PUF). The Accountable Care Organization PUF is updated annually, with full data for 2015 currently available (CMS, 2015a).

The focused variables in this study included the MSSP's incentive size (i.e., the predictor variable) of bonuses intended to influence and motivate health care providers and administration working in an ACO team-based setting. The dependent variables were the ACO performance variables: MSSP hospital readmission rates, outpatient ED visits, and per person expenditures of the Medicare ACO population. The variables examined in this study are included in the CMS MSSP ACO PUF. This 2015 database collects quantitative data from contracted ACOs who deliver care to the Medicare population to

determine whether goals and quality measures meet the defined benchmarks. These CMS developed and defined benchmarks include a 33-point quality scale encompassing four quality specific domains focused on the patient and/or caregiver experience and coordinated continuity of care as per patient safety and at risk populations (CMS, 2015). Each area plays a role in the adapted ACO collaborative approach in the delivery of universal quality care.

I used a linear regression model design to analyze the associations between the independent and dependent variables when using group outcomes for comparison of incentive size studied (see Field, 2013). This design type acts in three ways: control, elaboration, and prediction (Frankfort et al., 2015). Linear regression measures the predictor values or the influence of the independent variables on the outcome variables, thus quantifying the findings (Field, 2013). Field (2013) referred to the use of a straight line to define the slope of the line (i.e., gradient) and the location that the line crosses the vertical axis (i.e., intercept point) on the graph generating the regression coefficient. I used the regression model to test the relationships between incentive size and ACO performance variables while controlling for organizational characteristics such as the number of participating hospitals; the number of beneficiaries age 85 and older; ACO size; the number of males; and the number of beneficiaries identified as disabled, including the percent of African American and Hispanic Medicare participants at the ACO-level.

Definitions

Accountable Care Organization (ACO): The new method for the delivery of

health services that utilize groups of providers, coordinating and cooperating with multiple departments and specialties to improve the current level of quality delivered care for Medicare beneficiaries (CMS, 2017).

Acute care readmissions: A recently-discharged patient who returns to the hospital within a defined timeframe as a result of the same acute health episode (*Webster's Dictionary*, n.d.).

Alternative payment models (APMs): A payment reform model that integrates quality and total cost of care into financial incentive structure (CMS, 2016).

Financial incentive: A monetary bonus/reward or penalty that can encourage individual provider or team behaviors (CMS, 2016).

Incentive alignment: A balance of incentive structure, incentive size, and in the identification of meaningful use metrics of quality when identifying success and motivating and encouraging provider treatment behavior.

Incentive size: The value of the extrinsic reward that reinforces provider behavior and performance (Conrad, 2015).

Medicare Shared Savings Program (MSSP): The federal program facilitating comprehensive and coordinated care to improve the quality of care for the Medicare population by using reformed payment models and structure of care by providing a shared savings option of reward when health status improves and expenditure growth is reduced or controlled (CMS, 2017).

Outpatient emergency department (ED) visits: An ED visit resulting in no hospital admission or an outpatient visit defined as less than 24 hours (CMS, 2015).

Pay for performance: The value-based payment model utilizing financial incentives in attaining specific performance measures (Lee et al., 2013).

Per capita health care spending: The per person health related expenses (CMS, 2015).

Total performance year spending: All health care related expenditures associated per person for a single year (CMS, 2015).

Value-based care: A single, bundled payment for health services per episode supported by quality improvement and cost savings (Lee et al., 2013; Scott et al., 2016).

Volume-based care: The traditional fee for service reimbursement for providers meeting volume specific goals (Burwell, 2015).

Assumptions

I held four assumptions in the study: (a) CMS's use of *meaningful measures* are in alignment with the production of quality in ACOs, (b) extrinsic rewards will modify provider behavior in medical decision-making, (c) ACOs are run operationally different, and (d) the process of improved quality is ongoing. I made these assumptions because each ACO operates differently in structure, and there are implications of weakness when analyzing statistical data and in determining performance quality. Controlling for variations in infrastructure, operational structure, and internal processes are challenging, but these factors were managed in the study with control variables to capture outliers (see Kronick et al., 2015). The control variables in this study included the African American and Hispanic races given their health disparities based on socio-economic variables, ACO size, gender, disabled beneficiaries, hospitals contracted to provide services to ACOs and

readmission patterns may alter based on the ACOs unique goals, and those aged 85 years or older because their health conditions are likely to be chronic and more complex meaning more expensive. These selected covariates had the potential to skew the statistics due to their extraneous nature. For these controlled confounding variables, resource usage is high; furthermore, expenditures are higher for those where health attention was delayed or the chronically ill and for those that are 85 years or older, resources are more frequently used, such as ED and hospital services, adding to the extreme health related costs that essentially skew the average usage and expenses of the Medicare recipients. These variables may inadvertently alter performance and are uncontrollable by the physician, regardless of motivation or medical decision-making.

Some ACO contracts pair with a hospital and others do not (CMS, 2017a; CMS, 2017b). A contractual relationship potentially influences the data, therefore, I included hospital participation as a variable to be controlled for. These control variables present as outliers and remain a threat to internal validity similar to regression artifacts (Shadish, Cook, & Campbell, 2002). Assuming that the operational structure of the ACO and the incentive design process of improvement are ongoing, I had to assume the inevitability of quality evolution through sound payment structures and in the coordination of services that optimize patient health and the related costs of care (see Conrad, 2015). Conrad's (2015) synthesis of literature on the VBPIT supported the assumption that the greater the incentive, the higher the ACO performance. However, the study presented obstacles in ACO structure and needed a solution based on factors of the operational structure and

incentive alignment between provider behavior or medical decision-making and the patient's health value.

Limitations

The limitations of this study included the threat to internal validity of the research, the internal structure of the incentive, assignment of beneficiaries per ACO, and lack of uniformity of procedures and services in delivering care. In establishing internal validity of the research design, I identified the independent variable (i.e., incentive size) as a predictor for the changes in the dependent variables (i.e., acute readmissions, per capita spending, and ED visits). Validity in the selection of beneficiaries was in question. Socioeconomic factors play a role in expected health outcomes due to disparities in the access to care for specific racial groups (CMS, 2016). Since the assignment of beneficiaries to ACOs is uncontrolled, there is no accounting for patient health disparities among socioeconomic differences. Selection bias surfaced as a threat to internal validity in the assignment of Medicare beneficiaries (see Creswell, 2009). The assignment of beneficiaries is not based on condition or health status but rather criteria includes age requirements, participation in Medicare, a qualifying provider visit (ACO related or not) within the last 12 months, proximity, and geographic location (CMS, 2017). Many health outcomes are predetermined by the quality and access to health care of the patient from childhood to retirement age, and these differences in health status are known as health disparities, impacting the health status of a variety of beneficiaries. The success of an ACO's performance is partly based on patient outcomes, so I controlled for two racial groups, greater health disparities, ACO size, and of patients aged 85 and older. To avoid

selection bias, I included all participating ACOs.

Operational processes define an ACOs' structure and managerial strategy to care. Weak or undefined operational methods are expected to have an indirect influence on the effect of the financial incentive size on performance measures within an ACO delivery setting. This diversity in organization infrastructure and processes of care are autonomous and lack uniformity among health care environments (Kronick et al., 2015). In the ACO environment, there are contractual applications to operations and processes of care which can also be used to ensure consistency in quality of care for this population. By contractually applying these parameters, there can be more control over spending and higher assurance that each patient is provided universal quality by following a standard of processes in delivering care (Kronick et al., 2015).

Scope and Delimitations

The scope of this research was limited to ACOs contracted to provide services and care to the Medicare population through the CMS MSSP. In the analysis conducted, I followed the 2015 structure of the MSSP and the collection of CMS archival data. The raw data collected are generated by individual ACOs. Each ACO provides a unique perspective because each ACO is operationally structured and managed differently with regulations surrounding incentive payment calculations but without universal standard operational processes with stipulations enforced by the CMS. There is questionable bias in the selection of quality metrics that signify the quality, and there are concerns of indirectly linked metrics that would indicate the incentive size. The diversity of the ACO's internal structure presented a potential bias and posed a weakness to the study. I

used archival data from 2015, before additional alterations of the incentive track and evolving quality measures that link provider treatment and decision-making as a source of improvement were used (see Holland & Knight, LLP, 2015).

In this quantitative study, I focused on the Medicare population, and findings were generalizable to this sample. The Medicare subpopulation was the generalizable boundary in the analysis. The ACO is a modified strategy delivering health services/treatment without access impeding quality of care or cost containment approaches applied (CMS, 2017a). The determination of a properly balanced incentive model could optimize the quality of care, further promoting comprehensive and coordinated care.

Significance

The findings of this study contribute to social change by informing the country's internal restructuring efforts of an ineffective and fragmented health care system with goals to strengthen the economy. Incentive-balanced alignments could add to the success of the ACO's organizational structure by identifying variables that represent outcomes linked to the incentive-formulated reward system. Providers perceive the value of care differently based on individual ethics and morals (Roland & Dudley, 2015). A motivationally-equivalent incentive size produces ethically-driven administrative decisions and provider treatment options that may be quantifiable, such as in a reduction in readmission, outpatient ED visit frequency of ACO beneficiaries, or resource usage affecting per capita expenses. At times, medical decisions are made in the best interest of the stakeholders, placing risk on the patient by denying or delaying access to medically

necessary services. Ethically-driven decisions are reinforced by autonomy, beneficence, and justice (Williams & Torrens, 2008). Medical and administrative decisions should not induce harm onto others but promote patient welfare with equal access to services in an environment where physicians have the freedom to treat patients without limitations or restrictions (Williams & Torrens, 2008). Incentive neutrality may hypothetically lead to improved health outcomes in ACOs (Kao, 2015; Kronick et al., 2015).

ACO structural efficiency can be enhanced when incentive size is large enough to stimulate the targeted provider decision-making behavior (James, 2012; Kao, 2015; Nix, 2013; Torchiana et al., 2013). Financial incentive models continue to struggle with the organizational balance of internal managerial or operational features that can forecast ACO success. ACOs assume the risk for their subpopulations' health outcomes via continuity and comprehensive delivery of care, while reducing resource usage within the ACO, using mindful organizing in operational processes and procedures (Abduljawad & Al-Assaf, 2011; Vogus & Singer, 2016).

The implications for positive social change align with a value-based, reformed payment incentive model. The development of an efficient operational process of ACO success and the identification of ACO characteristics of an effective financial incentive size may balance provider motivation and maximize the ACO subpopulations' health outcomes while controlling expenditures. The results of this study may assist in identifying characteristics of an efficient financial incentive model that could potentially reduce spending and improve health outcomes, providing a framework for successful operations in an ACO. A reformed, value-bundled payment and incentive alignment

could help to determine the suitable components directly contributing to successful ACO performance.

Summary

In hopes of attaining universal health care quality in the United States, the most recent strategic approach to enhance the quality of care is the use of emerging APMs. The use of financial incentives has been a feature of these APMs to improve health quality with the efficient use of health care resources, contributing to stability in the delivery of care. In this chapter, I highlighted the study design and the statistical, theoretical, and methodological approaches used. This chapter also included the empirical and methodological literature support of researchers who examined financial incentives and the defined benchmarks measuring quality features developed by the CMS that yield rewards to either the provider or the ACO. A more stimulating and balanced incentive will provide the best opportunity for ACOs to be accountable for their provider's altered medical decision-making, leading to improved health outcomes that indicate an operationally successful APM (Conrad, 2015, Kao, 2015). Improved alignment of external incentives with intrinsic provider motivation offers the greatest chance to alter provider decision-making behavior through a collaborative effort to deliver comprehensive and coordinated services (Kao, 2015).

The purpose of this quantitative research was the correlation of probable variable relationships applied through a cross-sectional design guiding the research questions tested through linear regression. I used secondary data in this study. The study was framed by the VBPIT, which involves a contractual component to generate and support

universal quality health care that aligns stakeholders with shared interests in the outcomes as a result of the financial incentive designs of the CMS programs (see Conrad, 2015). The theory further indicates the need to develop a motivationally-balanced reward mechanism (i.e., financial incentive) that produces ethically-influenced provider decision-making (Conrad, 2015). The significance and positive social change implications of this can be applied nationally with the potential to impact the operational restructuring of the health care delivery framework in the health care industry.

In Chapter 2, I will provide an analytically comprehensive perspective of related literature and empirical studies linked to a robust application of financially-influencing incentive size. Incentive size aimed at behavioral changes concerning the decision-making processes of providers and motivated coordination of services. The literature presented will provided validity and support in the research proposed and performed in my study.

Chapter 2: Literature Review

Introduction

Financial incentives and provider decision-making are often misaligned, which can contribute to the unreliable quality of health care and poor continuity of delivered health services (Conrad, 2015). Empirical studies have found that financial incentives can affect the health outcomes, spending trends, and resource usage of a defined population (McWilliams et al., 2015; Nyweide et al., 2015; O'Donnell, Anand, Ganser, & Wexler, 2015). Financial incentives are also used to motivate provider behavior; they improve health outcomes and reduce spending through defined and specific benchmarks with the ultimate goal to deliver improved comprehensive treatment behaviors and the potential to influence the physician's medical decision-making (Abduljawad & Al-Assaf, 2011).

In an effort to improve quality and efficiency, APMs, such as those set by the CMS (2015b), provide a reward, in this case an incentive. Rewards are meant to influence physician behavior in medical decision-making and treatment selection. ACOs offer incentives to engage providers to participate in a team approach to coordinate care and enhance medical decision-making with improved quality outcomes in mind (CMS, 2015b).

CMS is working on linking Medicare payments to quality performance measures featuring APM goals. CMS intends to link 30% of the Medicare payments and 85% Medicare fee-for-service payments to quality expectations by the close of 2016 (Burwell, 2015. CMS is striving to reach 50% and 90% by 2018 respectively, equating to more

conceptual models of community-devised ACOs meeting the surge in value-based care (Burwell, 2015).

The purpose of this study was to examine the relationships between incentive size and ACO performance measured by using rates of acute care readmissions, outpatient ED visits, and annual per capita spending. The Medicare beneficiaries served by ACOs participating in the MSSP are identified as the most at-risk population to receive "inferior" health care to privately-insured consumers (Spencer, Gaskin, & Roberts, 2013, p. 1731). A theoretically-supported incentive structure in an ACO setting allows for the clinical integration of services to provide complete and coordinated alignment of care with the strongest potential to achieve higher quality of care at lower cost (Conrad, 2015; Conrad & Perry, 2009).

In this chapter, I will cover the literature search strategy and literature synopsis of the data collection. My findings in this review contribute to the expansion of knowledge on the VBPIT. This chapter will also include an extensive review of the relationship between the incentive size of the MSSP and acute care readmission rates, ED visits, and per capita spending of beneficiaries in an ACO delivery setting.

Literature Search Strategy

The databases that I used in the literature search included ProQuest, Google Scholar, and the Education Resources Information Center online digital library. Studies were narrowed by publication year to include focused, timeframe-based literature on the ACA of 2010, so I could identify specific programs after the implementation of new payment reform alternatives and capture research from 2010 to 2016 on advanced

payment (i.e., capitation), shared savings, and Pioneer ACO models. Pioneer ACO models are designed for health care organizations that already provide coordinated patient care and allow provider groups to rapidly move from a shared savings payment model to a population-based payment model separate from MSSP (CMS, 2017b). I used each keyword search term interchangeably among the listed databases. Keyword search terms included combinations of the following: *incentive size*, *behavioral economics*, *value-based payment incentive theory*, *Pioneer ACO*, *MSSP*, and *alternative payment reform*.

The dependent variables in this study were *acute care readmissions, emergency department (ED) visits*, and *per capita spending*. I searched for these dependent variables in combination with the terms *accountable care organizations (ACO)* and *quality of care*. The literature search was also expanded to include variations of these key terms, adding a combination of *intrinsic and extrinsic motivation* to influence provider behavior, with the goal of capturing the economic effects of a behavioral perspective of aligned incentive size.

Motivation of Change in Provider Behavior

Care and treatment decisions by physicians are encouraged and influenced through financial incentives with the intent to improve performance that results in improved health outcomes and meaningful use of quality indicators (Abduljawad & Al-Assaf, 2011). Intrinsic motivation can be associated with any health professional with the power to influence clinical decisions. A review of studies linked to quality financial incentives indicates a negative impact on the chronically ill in a preventative care setting,

but positive effects were seen in the same group if incentive bonuses occur at the provider level (Peterson et al., 2006). Based on a review from Peterson et al. (2006), there is support of a principal-agent relationship with the use of incentive-structured ACO contracts. This relationship demonstrates how applying behavioral economics to adjust and align incentive size with ACO performance can expand the knowledge surrounding the value-based incentive payment theory (Conrad, 2015; Conrad & Perry, 2009; Peterson et al., 2006).

This research is one of the first to apply the VBPIT. The theory application is not linked to a specific setting or group (e.g., an ACO). This is an aspect that actually adds to the expansion and strength of the theory (Conrad, 2015). Individually distributed incentive bonuses, as opposed to a group-based payment, promote a stronger influence of change provider behavior, further enhancing and aligning performance (Conrad, 2015). A universal standard of quality metric or preset benchmark applied in the allocation and in the calculation of incentive rewards does not exist; it is critical in identifying valid and reliable measures of quality performance to base incentives (Fisher et al., 2012).

The U.S. federal government aims to provide a monitored health care delivery environment, paired with a supportive payment system, such as financial incentives. This is a move that calls for the development of organizations that approach health care as a patient-centered team; with the goal to support high-performance levels based on value-based payment incentives reinforced by universal processes (IOM, 2001). Core patient needs in health care include care that is safe, effective, patient-centered, timely and efficient with meaningful-use, quality-related outcome measures (IOM, 2001; Vogus &

Singer, 2016). Provider behavior is central in continued improvements directly correlated with quality of care and improved health outcomes (Abduljawad & Al-Assaf, 2011).

Our nation's quality improvement strategy is designed to motivate health care provider behavior. Financial incentives are a fiscal tool in the country's strategy to improve quality by aligning incentive size with defined contractually standard clinical processes (Siddiqui & Berkowitz, 2013). By defining and defaulting standard treatment and related clinical processes through federally regulated programs, such as MSSP or the Pioneer APMs, contractual expectations can be assigned and assessed to deliver universal quality of care among all health care consumers specifically those that are privately insured, and not just for those participating in federal health programs. Motivated provider decision-making guided by incentive strength will empower providers to take accountability for their delivery efforts in a health care system without a contractually defined method of reimbursement distribution universally used to affect cultural diversities and improve health outcomes at the ACO/provider level (Siddiqui & Berkowitz, 2013). Contractual arrangements provide a medium for implementing and assigning standardized clinical processes linked to benchmarks while ensuring quality expectations are achieved.

In its current model, higher baseline spending suggests a larger initial savings for the ACO, however as benchmarks align with the previous performance year, ACOs will struggle to continue the current rate of savings. Research suggests that greater financial incentive and modified benchmarks will lead to larger savings (Colla & Fisher, 2017; Rose et al., 2016). An emerging strategic improvement to consider is shifting the existing

benchmark approach to a more effective method of measure, by applying a CMS predefined benchmark hence applying a level of risk to what is now defined as a bonus only program through regulatory revisions (Joynt Maddox et al., 2017). Through the use of benchmarks, universal quality can begin to form provider behavior that yields cost effective concentric care and quality enhanced outcomes reinforced through a strategic method of balanced rewards and penalized risks. Using existing data to develop refined measures and adjust benchmarks that are provider-influenced and team concentric in nature, produces a controllable measure of quality by these stakeholders.

Currently, there is a need to design an efficient and responsive quality-based value incentive program suggested by policy changes or contractual arrangements with quality as a dependent variable in ACO operational success as it relates to spending and resource usage, leads to improved health outcomes, and streamlines coordinated care. In most of the reviewed literature or pilot program demonstration studies working collaboratively with the government and private, commercial insurance on strategies attaching quality-based performance to rewards. Significant data identified and relevant material surfaces when correlating the research variables and ACOs.

Theoretical Foundation

Value-Based Payment Incentive Theory (VBPIT)

The theory applied in this study is the VBPIT. This theory is a recently established microeconomic conceptual framework (Conrad, 2015). To date the VBPIT has not been applied to the ACO setting with value-based alternative payment models brought forth by ACA (Conrad, 2015).

Based on the concept of loss aversion, the direct incentive will elicit a stronger response to behaviors or outcomes that are more rewarded or penalized through weakened marginal value of net income (Conrad, 2015). It is suggested that, through behavioral economics, a *default* can be utilized in delivering services or treatments, an action which can support the most cost-conscious decision. The size of an incentive is expected to absorb the operational costs of the organization. A fixed payment is conceptually expected to produce a stronger behavioral response from the provider and organization delivering the care, perceived through the provider's assumption of the actuarial risk (Conrad, 2015). The financial incentive and the attached quality measure create a level of provider accountable in their medical decision-making, provided the value of the incentive successfully induces provider participate in a contractual arrangement, such as the MSSP. Providers are influenced by consistent and stable payments over a set period of time; these motivators can be defined through contractual payments (Conrad, 2015). Conrad (2015) warned about the consequences of ACO payment arrangements in its existing form of incentive, a form in which rewards are based on improvements, and not the level or quality of performance.

Origins of the VBPIT stem from a blend of the principal-agent theory and behavioral economics, a blend which can be applied to the internal structure of the incentive design and the optimal incentive size correlated to the value of care (Conrad, 2015). The VBPIT explains the relationship between financial incentives and behavioral components that influence behavioral changes in delivering value and quality. The focus of this research with the use of this theory is between the contractually-defined provider

behavior at risk of *crowding-out* intrinsic motivation related to medical decision-making and the operationally restructured internal processes based on sufficient incentive size value.

Conrad's (2015) findings of the VBPIT suggest that robust incentive size payments be defined through contractual agreements, such as the MSSP. The MSSP outlines the specified goal to reduce health spending for the Medicare patient subpopulation with the use of a shared savings technique through incentives; these incentives are defined as a percentage of the ACOs net savings as a result of the provider's team approach to effectively coordinate health services. The incentive size or value should be large enough to encourage provider participation by offering a reward for quality, intending to improve provider/ACO performance and medical decision-making (Conrad, 2015).

A relationship must exist between the provider, facility, and the insurance organization in order for all involved parties, stakeholders, to be successful at cost-effective care (Larson et al., 2012). There is a lack of regulatory contractual requirements between payers and providers. This requires operational restructuring of the traditional payment strategies with the inclusion of regulatory contracts ensuring the delivery of universal quality to consumers when participating in federal, and eventually private insurance organizations. Standardized or universal clinical processes allow all stakeholders to absorb the risk. Absorbing the risk means that both the payer and provider are accountable for providing improved health outcomes, a reduction of spending patterns

reflective of resource usage, and more cost-effective medical decision-making of provider behavior (Larson et al., 2012; Torchiana et al., 2013).

The traditional fee-for-service reimbursement methodology alters the provider performance, incentivizing overuse of health resources, and leading to misuse and waste in the allocation of services (Menon & Kumar, 2014). Overutilization leads to increased expenses, poor provider decision making, and misuse of health resources (such as the emergency department), all of which impact the level of care quality and the consumer's perception of that quality. The MSSP suggests a recalibrated repayment methodology with a stringent use of financial incentives to improve the quality of care by providing accountability in performance. Customary fee-for-service payments revolved around the volume of services, rewarding health outcomes that are indirectly uncontrollable by the providers and lacking in accountability in delivering quality care (Menon & Kumar, 2014). Value-based care utilizes an efficiency approach to care, through continuity of services leading to cost reduction and improved quality of care. Both value and volume of care are rewarded through financial incentives; but apply behavioral economics differently. Different behaviors are encouraged in both strategies; quality plays a role in the value-based rewards, where volume-based incentives fail to address quality in the delivery of care. Actuarial risk surfaces in the incentive design as health outcomes may be beyond the provider’s control, particularly in small autonomous medical practices (Conrad, 2015). Organizational structure also impacts the financial incentive design (Conrad, 2015).

In this research, the VBPIT is applied to ACOs contracted to participate in the MSSP. The theory embraces diverging concepts of the principal-agent and behavioral economic theories. These are autonomous strategies actively utilized in delivering value-based care controlled by an incentive-formulated reward system meant to align quality-delivered care with provider treatment behavior and medical decision-making inducing comprehensive care (Conrad, 2015).

Principal-agent theory. The principal-agent theory informs my study and the VBPIT through the use of contractual arrangements in the participation of the MSSP. The principal-agent theory assists in policy building and the identification of characteristics that support successful incentives by investigating size, incentive formats, and structures to initiate robust and competitive incentives. Eliciting provider participation, the balance between the right-sized incentive, and ethically-aligned physician actions can be constructed (Kronick et al., 2015). The study design engages the MSSP which participates in contractual arrangements with CMS to provide care in an ACO setting with strategically designed quality measures. Care is delivered in the best interest of the stakeholder it impacts; this portion of the VBPIT engages in the study design through the use of a contract and aligned interests. The principal-agent theory also frames a contractual arrangement between the principal and the agent, aligning shared interest of the two parties involved (Conrad, 2015). Through the CMS the MSSP provides a contractual agreement that sets standards of quality to improve the value of care by placing parameters of rewards and penalties dependent on quality-defined benchmarks.

From the behavioral standpoint, these quality-defined benchmarks must not be

aimed at tasks that are predetermined as innate intrinsic behavior, but rather at the implementation of quality-specific benchmarks directly linked to rewards allocated at the provider level. These benchmarks provide expectations for quality of care and elevated levels of comprehensive care, theoretically achieving improved value of care with federal focus on clinical quality, improved health outcomes, and reduced expenses associated with the use of effective incentive strategies (Conrad, 2015; Shortell, 2016). Contract characteristics contribute to the success of an ACO and influence organizational structure by aligning services with continuity of care factors attributed to ACO implementation, formation, and performance expectations (Fisher et al., 2012). Continuity of care is central to creating realistic benchmarks to reach optional efficiency and standardized clinical support with evidence-based support linking health outcomes (Fisher et al., 2012). The structure, capabilities, and activities of an ACO need clearly defined goals, sharp structure, engagement strategies to improve provider decisions, continuity of care, and quality-enhanced improvement methods (Fisher et al., 2012).

Congruence of formation and operations includes the local market competition, multiple stakeholders, state political environments, per capita spending and resource utilization (Fisher et al., 2012). Vital processes are needed in contracts to establish defined quality and cost targets in shared saving disbursements and risk adjustment. These processes provide a mechanism to apply the reward or penalty for linked quality measures to shared savings, resources used, total care of cost defined, and contractual allowances for modifications as needed based on how quality is measured and what is measured (Fisher et al., 2012).

The principal-agent theory also implies that contractual payment arrangements need to be structured and defined with strong incentives geared toward value of care with implications to policy-building. Additionally, it suggests that more robust incentives need to be paired with quality measures, aimed at size and form of incentives. The intent of the principal-agent theory is to engage the health care provider in performance-based actions aimed at improved health outcomes for the ACO subpopulation of the study; therefore, a need exists to incorporate behavioral economics to the provider's treatment patterns, in order to produce the highest level of quality and value.

Behavioral economics. Applications of behavioral economics exist in the ACO setting of care. Behavioral economics offers the potential to proliferate the effects of the "shared savings" incentives with enhanced health outcomes through balanced motivations for ACO providers and administration (Luft, 2015, p. 2195). Such connections add to the knowledge of which features will encourage an alignment of incentive size and ACO performance (Khullar et al., 2015; Luft, 2015).

Kao (2015) suggested that the components of behavioral economic theory affect the allure of incentives to providers; resulting in an uneven distribution of attention in situations where "sicker" patients receive more attention. Additionally, if incentives are too strong or large, they can also impact the provider's sense of autonomy and conflict with complex decision-making common in the subpopulation of chronically ill health care recipients defined in the research as the ACO (Kao, 2015). Tying this to the behavioral economic perspective through the contract, the tool used in the principal-agent theory, will also induce the contracted provider's participation. Individually diverse

provider ethics and moral influences surround the use of financial incentives in health care payment models, contributing to the risk of unintended consequences. Conrad (2015) suggested that providers take a role in the incentive design and monitoring of incentives. A competitively aligned incentive value with a motivating incentive size increases the continuity of provider-involvement and adhering to monitored clinical tasks in the ACO setting. These balanced incentives assist in the development of a successful payment design with shared risk and savings, thus aligning ACO stakeholders shared goals and clarity in individual influences of interest.

With equal contribution to the VBPIT, behavioral economics and the principal-agent theory each play a role in support of a defined use of incentive structure responsible for promoting greater clinical quality. Some components that contribute to this level of quality include the use of both individual and group-based incentive rewards, a balance of gain and loss in incentive risk and reward, balance incentive value, use of standard performance metrics, timely payments, and sustainable programs (Conrad & Perry, 2009). Each quality component listed uniquely has the potential to inform and support the restructuring of the nation's health care delivery and payment system, through a contractual regulatory assurance through participation in federal programs.

Loss aversion. The fear of loss is three times stronger than monetary gain, a phenomenon known as loss aversion (Khullar et al., 2015). Behavioral economics provide validation that individual providers vary in their response to incentives. However, provider response can be controlled with proper alignment of structural and operational features of ACOs in order to guide program development and policy building,

maximize benefits, and lessen unintended consequences (Kao, 2015; Roland & Dudley, 2015). Literature pertaining to economics proposes that providers are more sensitive to penalties or losses than of rewards and bonuses (Roland & Dudley, 2015). The loss aversion concept is applied to behavioral change strategies. To effectively motivate contractual compliance the fear of loss is a stronger influence of behavior change than the actual loss or penalty (Gächter, Orzen, Renner, & Starmer, 2009).

Default options. A derived concept from behavioral economics is defaults. Defaults create an unrestricted environment that secures autonomous options by placing defaults as the status quo or standard embedded in contractual standardization of processes. Applying defaults will capture lower expenditures and usage supported by the VBPIT. Defaults can guide decision-making treatment choices on costly service options or medications (Conrad, 2015; Khullar et al., 2015). Behavioral economics applied to incentives can potentially enhance the initial incentive as determinants of behavior, influenced by incentive strength or size (Khullar et al., 2015).

Empirical evidence indicates that complex decisions create diminished reaction to an overwhelming choice. As a result, a more simplistic choice can help initiate progress and coordination of patient care more effectively. Promoting a change in provider treatment behavior or in medical decision-making is the goal, especially considering that a subject's proximity to a goal also impacts the level of motivation (Powers et al., 2016). Goals should be specific, measurable, attainable, realistic, and time defined. The closer a goal is perceived, the more attainable it becomes (Powers et al., 2016). Contractual benchmarks offer control through defaults imposed on provider options, directly reducing

expenditures and adding uniformity to the processes involved in delivering appropriate and efficient care.

Crowding out effect. The *crowding-out* effect is an unintended consequence when determining which type and size of motivator could influence a physician's medical decision-making or its processes (Kao, 2015, p. 2220). Tasks intrinsically related to incentives will have a negative effect on providing care in more complex care situations, as in the case of the chronically ill, who are subject to the *crowding-out* effect (Khullar et al, 2015). The crowd-out phenomenon is counter-productive for those innately obligated by profession to deliver a level of quality or comprehension of care guided by internal motivation of the provider (Khullar et al., 2015). According to Khullar et al. (2015), incentive payments are more effective when distributed in a series of small and frequent payments that are within the provider's control (Conrad, 2015). Access to patient data is essential when immediate responsive actions are needed to adjust effectiveness and ACO performance access is easily obtained in an ACO setting of continuity

Intrinsic and extrinsic motivators. Casalino et al. (2003) found that care management processes yielded high quality scores. These physician organization scores were publicly recognized and used care management processes 1.3 times more often. The act of being publicly acknowledged for their efforts in quality performance promotes intrinsic motivation, reinforcing the use of clinical processes and balancing the motivation sensitivity of provider performance. Behavioral economics outline intrinsic motivation. A challenge of the incentive is crowding out when sustainable performance is sought (Promberger & Marteau, 2013). Berenson and Rice (2015) found that in the

redesign of the health delivery system, an intrinsic motivation is expected to engage quality improvements, but there are concerns of negatively skewing behavior when incentivized with monetary gains extrinsically. A balance between intrinsic and extrinsic incentives is needed to alter behavior (Conrad & Perry, 2009). With strategically-developed ACO contractual agreements, the infrastructure will define standards of universal clinical processes of care to assist in creating a reliable system of quality and continuity of care.

Economic behavioral theory also suggests that incentives must be personally rewarding for altruistic providers; alternately, extrinsic rewards could reduce the level of internal motivation, particularly if the task to which the metric is attached has little value to the provider or is mundane (Abduljawad & Al-Assaf, 2011; Roland & Dudley, 2015). In an ACO setting, financial incentives need to directly correlate to a value-based task or procedure that encourages coordination and streamlined services. A performance framework, through shared interest and value-based incentive performance, contribute to a sustainable solution supported by theory.

Application and Rationale for Theory Selection

Reinforced by economic behavioral theory, the VBPIT supports contractual arrangements by defining benchmarks rewarded by incentives, encouraging quality improved health care with reduced expenses, and identifying motivational incentives sensitive to provider responses who engage them in value-based care (Conrad, 2015). The VBPIT theory applies to designing and reformulating efficient incentive size supported by organizational structure to counterbalance potential crowding out of provider-specific

intrinsic motivators (Conrad, 2015). An increase in poor performance can be attributed to psychological hierarchies of needs, self-determination framework, over mining autonomy, competence, and relatedness of intrinsically-formatted motivators (Kao, 2015). These factors contribute to the perspective of performance contingent on the provider's intrinsic motivation in tasks or activities that are inherently interesting or cognitively challenging to the provider, the financial incentive may *crowd out* this inherent intrinsic motivation; when performance improves it is dependent on the size of the incentive, acting negatively in the decision-making process when ordinary tasks are rewarded (Kao, 2015).

The VBPIT has been minimally applied; the theory is new and has been minimally utilize. Conrad introduced the theory late 2015, few applications of the theory have been included in any completed scholarly research to date. Conrad's (2015) VBPIT has been mostly conceptual to date and has not expanded into theoretical applications. Evidence was provided in one study on the cost of treatment affecting the quality of care, specifically access to medications as a variable affecting adherence to treatment plans. By impacting cost and setting the costs lower, spending as a whole is reduced by using a default to the generic medication and value-based delivery of service options as described in behavioral economics (Lee et al., 2013). Defaults used in behavioral economics can crossover into procedures and into the coordination of care delivered in the ACO setting to aid in the reduction of expenditures and promoting value-episodes of care, especially when these activities are supported by incentives outlined in contracts.

The rationale for use of the VBPIT lies in the policy shift to value-based care and

the use of incentives as a tool to implement quality improvements (Burwell, 2015). Given the behavioral component of the financial incentives' design and structure, there is a need to understand that incentive size will optimally promote efficient and effective provider influence to advance delivery processes and behavior patterns aligning quality, value, and coordination of services. The internal structure of an ACO varies and this difference is directly correlated with inconsistent operational structure of internal clinical processes of the accountable care strategy that relies heavily on a number of internal and external variables (see Conrad, 2015). The lack of ACO structured uniformity in aligned processes that will perpetuate the success of a complex system of health care also correlates with inconsistent operational structure (Casalino et al., 2003; Nix, 2013). Both quality of clinical provider processes and improved decision making aimed at key contributors of success yield improved health outcomes, inclusive of incentive delivery processes that additionally influence the success of the incentives (Conrad, 2015).

The VBPIT was chosen to guide the research and its framework, as it allows for the correlation of redesigned alternative payment models, with use of contractual requirements of the ACOs participating in the MSSP and the influences of powerful incentives on decision-making of the ACO provider, as well as administration. The study's goal is effective formatting and alignment of financial incentive size in the reformed value-based APMs grounded by the VBPIT, supporting the promotion of comprehensive and cost-efficient care with elevated expectations and contracted standards of quality set by a regulating agency. Opportunity cost or countervailing the barriers and challenges of the incentive value-based payment models, may present a

balance of four behavioral economic concepts: loss aversion based on defaults, crowd out, frequency and means of payment, and intrinsic and extrinsic motivation strategies (Arnold, 2016; Conrad, 2015).

Contractual arrangements of Medicare through its shared shavings program can help define the payment incentive formats that will align with the cost of providing care at a risk to enhance the subpopulations health benefits. This is defined by the value in episodes of care (Conrad, 2015). Diverse incentive constructs will perform differently based on how value is perceived by the health care providers and without the use of *soft autonomy*, thereby encouraging provider participation in the financial incentive model. Behavioral economics support setting the most cost-effective option as the default in medical decision-making without restricting treatment options (Khullar et. al, 2015).

Shortell (2016) broke down multiple theories chosen to understand ACO development and its evolution, presenting alternative perspectives not inclusive of the purpose and goals of this study, hence the alternate decision to use the VBPIT. With incentive size as the independent variable, the predictor of behavior in this previous study is defined as the total benchmark expenditures. The provider behavior and health outcomes are based on ACO performance measures. The dependent variables are acute care readmissions, outpatient emergency department visits, and total year spending per Medicare recipient. The VBPIT describes the roles of the MSSP, the incentive design, contractual benchmarks, provider motivation, and incentive size to aid in restructuring a responsive and comprehensive delivery system of care. This is applicable to an ACO setting, governing chronic, complex conditions by placing universal clinical processes in

place through contractual arrangements and by pairing incentive expectations to quality benchmarks (Conrad, 2015).

Each of the study's research questions validates the potential impact on health outcomes for the Medicare subpopulation. Federally-regulated contracts can be used to dictate structure and format of incentive payment models that identify ideal incentive size. Optimally, these contracts will align provider motivation and increase accountability through universal clinical standards of care, these standards incorporate a series of defaulting internal medical decision-making processes, prompting providers to follow recommendations of care as well as assist in medical-decision making with more complex situations. These processes are designed to serve the most at-risk populations, the unhealthy, allowing the chronically ill to receive reliable, comprehensive and collaborative care. Increased accountability produces aligned strategic spending and resource usage to reduce expenditures sustainable in a capitated or bundled payment option used in the ACO (Roland & Dudley, 2015).

The components of the VBPIT have not been applied to the ACO setting or a federal program. The principal-agent and behavioral economic theories have been utilized in similarly aimed research. Behavioral economics is the source of the prospect theory. The prospect theory suggests that an individual, the health provider, is more motivated to avoid a loss or penalty than to earn a gain or reward (Torchiana et al., 2013). Provider motivation can be intrinsically or extrinsically inspired. Each unique provider perspective impacts medical decision-making or treatment behavior differently. This internal determinant is subjective when evaluating balanced incentive strength and

measures of quality used to quantify the provider's behavior, further economically affecting stakeholders. The prospect theory is used to frame research by Torchiana et al. (2013) with the Massachusetts General Physician Organization (MGPO) quality incentive program; the incentive size was a mere 2% under a 6-month interval review of quality measures. The program increased incentive payments to providers by $15 million; yielding improved compliance and increased efficiency of processed services with a reduced frequency of emergency department visits (Torchiana et al., 2013).

Werner et al. (2011) also used the same form of the prospect theory to frame their study on pay-for-performance incentive format and its relationship with quality improvement by using stronger incentives to attract the provider performance needed to achieve the outcomes sought. Pioneer ACO program research by Williams et al. (2015), based on characteristics of the ACO, shows links to health care spending of this subpopulation using a social action perspective in theory. This perspective promotes increased provider involvement in deciding quality measures that align with similar health outcomes.

Larson et al. (2012) did not disclose a clear theoretical framework for their study on Brookings-Dartmouth private ACOs. The features of their research design imply a clear fit to the VBPIT with establishing contracts and the requirements of contractual agreements in the development of formation models for ACOs, thereby placing structural organization as a component in the contract. This is directly connected to the principal-agent theory component of the VBPIT. No previous precedents had been set and no ACO formation had been clearly identified in structural organizations as successful.

Additionally, calling for clear and contracted processes with shared aims and connections to personal interests or motivations supports the potential benefits of VBPIT.

Each research question correlates with the independent variable and with each dependent variable outcome. Incentive size influences ACO performance, thereby directly influencing the rise or fall of acute-care readmission rates, frequency of emergency department visits, and per capita spending of ACO MSSP beneficiaries. As incentive size subjectively influences provider behavior and decision-making, there is a behavioral economic perspective to incentive. Additionally, a contract is in place between the ACO and the federal government as a third-party payer through the MSSP. A principal-agent connection exists in the research. Benchmarks and identified quality expectations can be incorporated into the contract as a measure of reward and clarification in the metrics of quality.

Literature Review of Variables and Concepts

Variables quantified in the research include incentive size, per capita spending, outpatient ED visits, and acute readmissions of beneficiaries of ACOs participating in the MSSP. In order to comprehensively analyze the motivated behavior treatment changes of providers and facilities consistent with the quantitative research study, literature support is presented that relates to the constructs of ACOs engaged in a reformed APM inclusive of value-based incentives targeting improved quality. The roles of the three dependent variables are to identify a feature of quality in the measures captured in preexisting data. These measurements are the number of acute care readmissions, outpatient ED visits, and total performance year spending per participating ACO beneficiaries of those

participating in the MSSP.

Quality of Care

The quality of health care in the United States is lacking consistency, continuity, and the coordination of services between health care organizations and providers (CMS, 2015b; CMS, 2017a). Quality in health care is further impacted by the lack of infrastructure to support standardized processes and incentive alignment contributing to the low level of quality care received (Colla et al., 2016; Conrad & Perry, 2009). Standardizing clinical processes require physicians to forfeit a measure of autonomy in order for ACOs to be successful in the shift to value-based care with a streamlined team approach using universal clinical practices (Colla et al., 2016).

Higher rates of readmissions and poor health outcomes correlate to a lack of coordinated care, and 20% of the readmissions are elderly and labeled as Medicare beneficiaries (Robert Wood Foundation, 2013). A recent study found no difference between commercial and public (i.e., MSSP and Pioneer ACO model) ACOs in 30-day readmission rates but instead found that ACOs increased the occurrence of follow-up care of the same subpopulation (Nyweide et al., 2015).

ED visits and readmissions are costly, and hospital costs represented 32.1% of the gross domestic product expenditures in 2014 (Centers for Disease Control & Prevention, 2016). ACOs are associated with lower health expenditures and less ED visits of the studied Medicare subpopulation (Colla et al., 2016; McWilliams et al., 2015). Modest declines in spending are evident within the first year of Medicare repayment models, such as the Pioneer ACO model and Shared Savings, when compared to commercial ACO

incentive payment models (Colla et al., 2016; McWilliams et al., 2015). The Institute of Medicine (IOM) defined quality as "the degree to which health services for individual and populations increase the likelihood of desired health outcomes and are consistent with current professional knowledge" (Docteur & Berenson, 2009, p. 1). On a broader scale, the Agency for Health Care Quality defined quality as "…doing the right thing at the right time in the right way for the right person and having the best results possible: (Docteur & Berenson, 2009, p. 1). Maximized quality can exist but is not dependent on a single provider's medical decision-making ability or behavior in treatments. This optimal level of quality requires an infrastructure of operations and standardized clinical processes to support and balance provider ethics with aligned treatment behavior and resource usage (Kronick et al., 2015). Quality-based processes are a vital structural component of an incentive model and contribute to the format of the incentive design.

In 2013, the United States spent $7 billion on inpatient hospital costs, and readmission expenses for the Medicare population equaled $5.2 billion, even with a decrease of 13% over a span of 5 years (i.e., 2009 – 2013; Fingar & Washington, 2015). Inpatient hospital stays are costly, and preventable hospital admissions in 2012 totaled nearly $26 billion in expenditures (Clancy, 2013). Preventable hospital admissions suggest that preventative or ambulatory care was not provided, due to patient delay or in access to care (Clancy, 2013). Many times, readmissions or admissions to an inpatient facility are due to a simple lack of coordinated and comprehensive care (Nyweide et al., 2015). Medicare expenditures are projected to increase federal budgets by 1.4% by 2030 (Blumenthal, Davis, & Guterman, 2015). Reduced health-related spending can be

accomplished through various methods of cost containment and resource usage strategies, unlike fee-for-service reimbursement methods (Epstein et al., 2014). Reduced spending was noted upon the realization of ACOs, presenting average reductions of 3% per Medicare recipient and a 2% cost savings for those with multiple chronic conditions (Colla et al., 2016). Researchers have suggested a potential cost savings of $26 to $48 billion exists with integration and coordination of services, significantly reducing hospitalizations and ED visit expenses (O'Donnell et al., 2015).

Coordination of care for Medicare beneficiaries with five or more chronic conditions resulted in a more distinct reduction of expenditures because costs related to these multiple conditions are two to three times more than those that have a single medical condition (O'Donnell et al., 2015). Changes in expenditures on procedures, imaging services, and tests contribute to lower spending on outpatient care (McWilliams, Landon, & Chernew, 2013). These changes can be attributed to the use of an Alternative Quality Contract (AQC) utilized by DHHS (McWilliams et al., 2013). After 2 years of AQC implementation, there was approximately a 66% reduction in health-related expenditures for Medicare recipients (McWilliams et al., 2013). Song et al. (2014) found that use of AQCs, such as those used by the CMS, improved quality and reduced spending by up to 9.1%. Contractual arrangements through federal programs have provided additional methods of cost reduction or slowing for vulnerable Medicare beneficiaries. The ACO strategy has lowered Medicare spending by $417 million since its implementation, reducing readmissions resulting in fewer costly hospitalizations (Evans & Demko, 2015).

The structural characteristics of incentives need to be reformulated into an efficient model with short reimbursement cycles linked to meaningful measures of quality, payable directly to providers (Fisher et al., 2012). The structural component of the financial incentive contributes to compliance of the metric and the provider's motivation level (Torchiana et al., 2013). The IOM (2001) highlighted that the existing structure of the U.S. health care system is a fragmented obstacle, reversing the weak level of health care quality provided in the United States with much needed accountability, transparency, and efficiency (Peterson et al., 2006; Salisbury-Afshar, 2012). As a result, the CMS-devised APMs use financial incentives as a strategic hub. This new strategy assists in altering provider treatment behavior in response to the country's "triple aim" of enhanced quality of care indicated by improved health outcomes, reduced spending by strategizing resource usage, and efficiency in the delivery of care (Siddiqui & Berkowitz, 2013; Vogus & Singer, 2016).

ACOs and Incentive Size

To offset the expenses generated from the regional and local chronically ill subpopulation, the country's economic health goal is to create a shared risk pool of health care beneficiaries for both sick and healthy consumers. This risk pool will be manageable at a geographically-specific level (Teitelbaum, Riegelman & Wilensky, 2015). In an attempt to prevent adverse selection, the number of young and healthy consumers (aged 18-34), with health insurance, must increase by at least 40% within the first 2 years of the ACA's implementation. Only 28% of this subpopulation was participating in the insurance mandate in 2014, leaving the burden of cost containment squarely on the

federal programs (Teitelbaum et al., 2015).

Identifying ACO infrastructure qualities and outlining the characteristics of an operational financial payment model assist in determining effective applications of intrinsic and extrinsic motivations of the provider and the facility. The ACA of 2010 expanded ACO initiatives and the DHHS was required to promote a shared savings program to respond to the increasing expenses of the Medicare fee-for-service methods (Association of State and Territorial Health Officials, 2013). ACOs became the instrument to achieve the triple goal of enhancing quality, lowering expenditures, and improving health outcomes of a defined population (Vogus & Singer, 2016). With the recent implementation of ACOs, the CMS delivered three alternative payment options utilizing financial incentives. Value of care was emphasized in contrast to volume of services, patients, or procedures, an emphasis intended to catalyze elevated quality. This program implemented three methodologies of ACO design: Advanced Payment, Pioneer ACO, and MSSP models (ASTHO, 2013).

The APM provides an up-front payment disbursed to contract ACOs, but also places a benchmark on a number of quality-related outcomes and provider behavior (CMS, 2013). If the goal or outcome measure is not met, the ACO and its health care providers absorb a loss and a portion of the advanced payment is returned to the government (CMS, 2013). The Pioneer ACO model is the second option of repayment models formulated by the CMS and it is a more aggressive form of the MSSPs two-sided model with greater risks attached to shared savings arrangements (Kessler et al., 2015). The Medicare Shared Savings Program also provides ACOs with a risk-based option

between two incentive tracks (Kessler et al., 2015).

ACOs deliver integrated and coordinated care among multiple provider specialties with access to diverse procedures and services, an approach which can avoid waste and align continuity of care (Burwell, 2015). The ACO setting nurtures a collective team approach to health care rewarding performance through the delivery of comprehensive services. When ACOs are economically successful, there is alignment between quality and performance. Theoretical alignment is expected to produce improved health outcomes to a subpopulation with evidence-based statistical support of incentive level or saving value effectiveness, as defined among a set of variables, however at best mixed results were produced on whether rewarding providers improves health outcomes (James, 2012). The aim of the organizational structure of ACOs and health care market is to impact quality and expenditures of resources specifically associated with serving the Medicare population. An empirical review of existing studies targeting performance shows no improved or positive health outcomes as a result of incentive payment usage or size. The size of incentive could not be determined to improved quality of care (Scott et al., 2016). In ACOs contracted with CMS under the MSSP, the targeted population is Medicare beneficiaries.

The shift to volume-based payment model value has taken the form of shared savings or bundled payment options, creating a competitive market that has the potential to save money through the use of contracted quality expectations as an ACO accountability factor. Quality levels also improved when providers were incentivized to reduce costs and support better performance in 11 of 14 quality measurement markers

(Lemark et al., 2015). Reduced spending changes need to be sustainable with tiered incentives to specific variables linked to increased quality. These findings mirror the analysis of new value-based programs, which bundle payment and look at reimbursable episodes of care, especially those inclusive of multiple service areas. This approach also works as a patient-centered collaborative effort (Lemark et al., 2015). A study performed by Colla et al. (2017) tested the effects of Medicare contracted ACOs on spending and utilization costs of clinically vulnerable beneficiaries. Colla et al.'s (2017) study measured several variables and variations of them, including quarterly per capita expenditures, hospital usage and ED visits and 30-day readmission rates similar to the variables inclusive of this dissertation. Findings indicated minimal reductions in hospital (resource expenditures) and ED usage yielding a moderate reduction in expenditures for those defined as having five or more chronic conditions, the clinically vulnerable. Similar contractual findings are seen in Song et al. (2014), when spending slowed with use of the Blue Cross Blue Shield of Massachusetts Alternative Quality Contract, with greater savings generated by those ACOs spending the most. This savings and reduced service utilization was primarily generated by the setting of care and clinical procedures ordered, linking performance to patterns of care given provider decision-making behavior (Song et al., 2014).

ACOs act as a catalyst to provide stronger quality incentive models, in a coordinated environment to accomplish components of the country's health goals (Conrad & Perry, 2009). The objective of ACOs is to hold providers and administrators accountable for the financial risks associated with resource usage, comprehensive care

and improved health outcomes. These contracted ACOs potentially serve the patient through universal clinical standards embedded in operational design and universal clinical processes, policy defining meaningful quality measures, and justifiable benchmarks within a collaborative approach of patient-centered care. O'Donnell et al. (2015) found that quality improvement programs like the ACO model, actually reduced utilization of services, thus slowing or reducing expenses and improving health outcomes in preventative and primary care for those with chronic conditions.

ACO and alternative payment models. The Patient Protection and ACA of 2010) began transforming the health care industry by improving transparency and accountability in health care delivery. New strategies are emerging that can offset contractual, standardized clinical processes and encourage effective medical decision-making behavior through economic payment reform, especially if supported by a robust incentive size (Fisher et al., 2012; Spencer, Gaskin, & Roberts, 2013). Without federal regulation to control procedures and treatment approaches, the system depends on the provider's behavior to act in the best interest of the patient (the principal) and ACO/provider (the agent) to create an environment promoting *incentive neutrality* (Berenson & Rice, 2015, p. 2156).

ACOs are relatively new to the public health care arena. The transition from volume to value-based care incentivized payment models is also new and is a by-product of the ACA of 2010 meant to improve quality and coordinate services while better managing costs and resource usage, ultimately reducing health care costs per person. The social change implications of this research are to refine the operational delivery setting

and the design of alternative payment methods using incentives and to provide the federal government with access to quantitative, reliable data to measure, monitor, and reward quality.

Alternative payment models using effective incentives have the potential to limit spending, yielding a shared savings for directly reducing usage of resources, but with a negative impact on beneficiaries, as this constraint of resources could influence access (Nyweide et al., 2015). Nyweide et al. (2015) research also used a multiple regression analysis of Pioneer ACO model beneficiaries compared to traditional fee-for-service Medicare program models to improve quality of care delivered in 2012 and 2013. Findings of this particular study were telling. Pioneer ACOs slowed its spending by -$35.62 per member in year one and decreased by $11.18 in Year 2. These small decreases combined accounted for a slowing of $280 million in 2012 and $105 million in 2012, in Medicare spending (Nyweide et al., 2015). Since its inception in 2011, ACO programs have reduced Medicare spending by $417 million. Lowered hospital readmission rates of 8% (2012-2013) are directly related to cost and a total of 150,000 less readmissions for this chronically ill subpopulation (Vogus & Singer, 2016). There were also noticeable changes in the usage of tests, procedures, and imaging, all of which impact spending and resource utilization (Nyweide et al., 2015).

Focusing on spending adjustments and trends, McWilliams et al. (2015) studied CMS's Pioneer ACO program in its first and second year of implementation. The savings variable was compared between ACOs participating in the program and a control group of non-ACOs. The baseline spending figures drove the savings in the ACO group. The

program was associated with moderate reductions in health-related spending of the Medicare population. Spending was lower when baselines were used to gauge quality (McWilliams et al., 2015). The Pioneer ACO program provides a larger incentive size and structure compared to the MSSP 2% incentive (McWilliams et al., 2015). The research of McWilliams et al. (2015) helped users to understand how baseline spending is related to savings and provided insight on the regulatory components of financial incentives as a means to control spending, using the behavioral economic concept of default options (Conrad, 2015).

MSSP ACO. The MSSP serves as a contractual arrangement setting standards of quality to improve the value of care. A value-based payment model, such as shared savings, with adequately motivating incentive size, contributes to the development of internal processes that consistently produce increased levels of quality of delivered care in a service coordination setting. The MSSP requires a minimum of 5,000 enrollees participating in a fee-for-service payment arrangement that follow nationally-recognized quality measures outlined by the AHRQ focused on the patient's experience, care coordination and continuity, preventative health care, and at-risk populations (Kessler et al., 2015). The MSSP offers two tracks with diverging risk levels. Track 1 is a one-sided model with small gains to be earned and no penalties applied. Track 2 presented a two-sided model with potential for both shared savings or gains and possible losses based on a defined structure of benchmarks and quality-specific variables (CMS, 2015). Track one is only an option in the first year of the contract, but organizations can contract with either track in that first year.

In determining the shared savings or loss of an ACO participating in Track 2 of the MSSP, 33 quality measures are calculated by domain scores and assigned a weight to determine the ACO shared savings and/or losses (CMS, 2015). The quality measures serve as a benchmark of evolving quality, phasing in increased and refined benchmarks in the ACO contracts second and third participation year, an action aimed at the two-sided model (CMS, 2015). The domains include an equal distribution of weight between the patient/caregiver experience, care coordination/ patient safety, preventative health, and at-risk population domains (CMS, 2015).

Track 2 of the CMS MSSP elevates the risk. In the ownership of ACO services and accountability is crucial. In an exchange for a higher rate of savings, more risk is assumed and is dependent of the benchmark identified as meaningful and useful. These benchmarks are based on the Medicare's fee-for-service data. Additionally, the minimum savings rates are applied, with consideration of the national growth rate as a contributor (CMS, 2015). Incentive size of the MSSP Track 2 is set at a flat 2%. The loss sharing limit in Year 1 is 5%, in Year 2 7.5%, and 10% in Year 3 (CMS, 2015). Quality points are allocated based on a sliding scale based on a percentile measure between 90% and 100%, for a maximum of two quality points. Each benchmark quality measure is assigned a point value based on the percentile of meeting the performance goal (CMS, 2015). In 2015, the MSSP provided two tracks, each with different incentive values rewarding ACOs and providers that met the outlined quality benchmarked goals. Track 1 offers a low risk option in accountable care but incentivizes at between 2% and 3.9%, where

Track 2 operates at a straight unwavering 2% with stricter accountability of a provider medical decision-making (CMS, 2015).

Now that ACO MSSP contracts are transitioning out of the 3 year participation arrangement, CMS has extended and revised the infrastructure, forming another Track 3 option, with new reconciliation calculations to balance the financial risk rates (CMS, 2016). Benchmarks have been adjusted for the 2017 performance year; as benchmarks are met, and new and challenging goals evolve annually. The sliding scale will also adjust at the 99th percentile, instead of the 90th percentile for per capita spending, shifting from national to regional growth rates to align spending more accurately (CMS, 2016).

The MSSP offers a modest 2% incentive, which is comparable to other alternative payment models developed under the ACA (Jha, 2013). Chronic care and vulnerable, or at risk populations, such as the Medicare population, emerge in some studies as the costliest subpopulation. One that utilizes health care resources at a higher rate, thereby spending more (Casalino et al., 2003; Colla et al., 2016; Gu et al., 2014). The finding implies a greater risk to the Medicare ACO with the potential to reduce spending without sacrificing quality, suggesting a systematic reform of the country's existing health delivery system (McWilliams et al., 2015). Medicare's reformed incentive model was related to slight drops in spending linked to inpatient and outpatient hospital usage (O'Donnell et al., 2015). Consequentially, the savings variable was significantly higher for the chronically ill population (Colla et al., 2016).

Colla et al. (2016) studied the influence of physician involvement and the patient's perception of the ACO setting, focusing on the effectiveness of care and

whether or not the enhancement of quality and controlled costs should be applied to the organizational structure of the ACO. They further indicated that there were decreased ED visits and inpatient care with the implementation of Medicare's ACO initiative, which was designed to combat excessive and wasteful spending. Taken from the National Survey of Accountable Care Organizations, the data were derived from October 2012 through May 2013 showed a drop of 12.2 ED events per 1,000 beneficiaries (Colla et al., 2106). Subsequently, a greater drop was observed in the chronically ill subpopulation, indicative of the Medicare ACO population, with 16.5 fewer ED visits (Colla et al., 2016).

Using enrollment data and socioeconomic factors, Epstein et al. (2014) studied 254 ACOs participating in the Pioneer ACO initiative and Shared Savings Programs in 2013. This study analyzed organizational infrastructure features, quality performance, and the difference between affiliated and nonaffiliated hospitals of ACO and non-ACO beneficiaries. Hospitals assess health outcomes related to quality, including readmission rates and risk-adjusted mortality rates for critical diagnoses (Epstein et al, 2014). Baseline patterns were found to have a positive impact on quality and benchmark adherence, but no difference in quality was found between participating and nonparticipating ACO hospitals and only mild differences existed in patient demographics and socioeconomic variables (Epstein et al., 2014). Nyweide et al. (2015) performed a multiple regression analysis of fee-for-service beneficiaries that aligned with Pioneer ACOs. Compared with similar beneficiaries within the equivalent market, the study showed that the Pioneer

ACO program experienced greater control of spending and resource utilization than non-ACO beneficiaries.

Incentive size. The size of the incentive is expected to predict the provider's level of influence and motivation by improving the consumer's delivery of quality care through coordinated services, enhanced decision-making, and efficient care. Incentive size has not been a focal theme in research and it has been studied even less in correlation with MSSP ACOs. Influence of incentive size on MSSP and other single program that impacts quality changes in the health care system has not been researched (Werner et al., 2011). Few studies have filtered their foci to the MSSP ACO contractual arrangements and the alignment of incentive size. Contractual alignment struggles to consistently balance motivation and provider behavior through the application of incentivized rewards (Scott et al., 2016).

The incentive size needs to be robust enough to alter administrative actions and outline consistent internal processes, provider performance, and behavior alignment (James, 2012). The size of the incentive can affect the allure of the incentive and therefore, alter the provider's behavior to align quality and delivery of care (Bardach et al., 2013). Provider medical decision-making and treatment behavior is dependent on the personal values of the physician. The motivation within the incentive size is also unique to internal or external factors of the environment context in the delivery of care (Conrad, Vaughn, Grembowski, & Marcus-Smith, 2016).

Incentive factors. External factors are uncontrollable features of the economic market. However, the internal structure of an organization is controllable, as they define

the operations of an organization, such as type and structure of the ACO (Conrad et al., 2016). Changing internal ACO processes can occur if financial incentives depicted in the MSSP impact a significant portion of the patients it cares for by aligning provider treatment behaviors with an effective and mindful use of incentives (Conrad et al., 2016). Therefore, the problem focus involves several components. These components are the influence of quality-aligned incentive sizes on providers, standardized and contractual processes of care for the population to ensure improved health outcomes, and control over excessive and wasteful spending by strategically applying quality metrics to performance measures.

There is no guarantee that incentives small or large will alter provider behavior (Scott et al., 2016). Layton and Ryan (2015) failed to find any association between improved quality and providers earning double bonuses. The unforeseen consequences of the bulky incentive actually produced better insurance plan options for consumers. Torchiana et al. (2013) research on the Massachusetts General Physicians Organization's quality incentive program showed two percent of the physicians' income was from the value of the incentives used. At a meager two percent or less, size was a contributing factor to the failure of the pay-for-performance program. This was simply not competitively robust enough to motivate the targeted behavior. Although the structure of the incentive was also important, other characterizing factors also played a role (Torchiana et al., 2013). At the risk of the *crowding-out* effect, stronger incentives could theoretically dissolve a shared savings, but could also induce large savings in ACOs (McWilliams et al., 2015). Their research was guided by the public interest theory, with

goals of provider engagement and consolidation of power in the market. Additionally, there is apprehension that stronger incentives will motivate unethical or promote unwanted behavior, instead of its intended goal of coordination of care delivery, improved health outcomes, and controlled expenditures. It is suggested that large incentives will be needed to capture the attention of the provider, and increase quality and improve health outcomes (Roland & Dudley, 2015).

Financial Incentives and Organizational Performance

The ACO value-based payment models utilize incentives to modify behavior and these models have the potential to lower costs and improve the level of quality of care delivered (Fisher et al., 2012). Multiple types of financial incentives are used in public and private health insurance plans, but they lack regulation, which must be levied to ensure the consistency of universal quality of care. There are two goals of the incentives: to motivate on-going improved performance and to incur a significant effect on provider treatment behavior (Abduljawad & Al-Assaf, 2011).

There is a limited focus of research on quality and financial incentives. Overall, studies have lacked consistent results and have been unfocused on ACO settings, primary care, or the chronically ill. Most studies have targeted primarily hospitals and insurance types (James, 2012; Scott et al., 2016; Spencer et al., 2013; Werner et al., 2012). Salisbury-Afshar's (2012) research posed questions as to whether financial incentives improve the quality of care delivered in the primary care setting. Insufficient evidence in Salisbury-Afshar's research led to an inconclusive relationship regarding whether or not improved quality occurs with financial incentives use. In an empirical review of seven

studies, six had moderately positive effects on quality and a single study found no effects.

Researchers found that structural features of the incentive payment model used by private and public insurers also affect the quality of care provided and provider behavior delivered (Collet et al., 2011; Spencer et al., 2013). Structure comes in two forms when considering financial incentives, the design of the incentive and the defining characteristics of the reward defined by the incentive model. Structure refers to how incentive-based payment programs will reimburse and the correlative formula for savings and loss of that stimulus. The incentive structural design should include meaningful measures of quality, effectively motivating provider behavior to align with the incentive value and avoid unintended consequences in ethics and impact (Jha, 2013). A secondary balance is the disbursement of rewards (incentives) based on a collective team-approach model of care coordination for health services among multiple specialties. Conrad and Perry's (2009) article discusses the value-based incentive design as a conceptual framework. They also suggest that a more comprehensive, well-defined incentive design and infrastructure would have significant potential to elevate the level of quality of care, more so than only using traditional pay for performance incentives (Conrad & Perry, 2009; Fisher et al., 2012).

Ten percent of the reviewed studies on quality and health outcomes need to align metrics and incentive program models to generate valid results (Torchiana et al., 2013). Weak incentives lead to uninterested and unmotivated providers participating in contracted goals. Nevertheless, the incentive's value must be appealing to the subjective perspectives of these professionals and their differing perspective of intrinsic motivation

(Abduljawad & Al-Assaf, 2011). Incentive value contributes strategically to producing enhanced quality, through consistent and cost-conscious medical decisions delivered to the ACOs subpopulation.

Jha (2013) revealed that incentives need to be rationally designed, targeting diverse settings and internal operational structures. A savings of 3.4% was found for quarterly performance and spending. The AQC organized through Blue Cross Blue Shield of Massachusetts was associated with less spending but did not produce reliable quality (McWilliams et al., 2013).

The early performance of the MSSP was studied by McWilliams et al. (2016) using Medicare claims from 2009 to 2013. Performance and differences in spending patterns were compared through ACO contracts; variables included ACO infrastructure, baseline spending, and dual ACO insurance carriers (private and public) contracted in performance year. Medicare spending was reduced in Year 1, but was inconsistent in the following years' beneficiary expenditures. According to McWilliams et al. savings was more prevalent in independent primary care group ACOs compared to hospital integrated ACO groups. Results showed improved performance was associated with ACO MSSP contracts on some quality benchmarks.

Comfort, Shortell, Rodriguez, and Colla (2018) studied performance of three ACO types participating in the MSSP; physician-led, integrated and hybrid. Their research compared quality, spending, and odds of earning an incentive bonus. No significant differences were found between the ACO MSSP structure and performance (i.e., quality of care; Comfort et al., 2018). Spending increased for the physician-led ACO

type as a result of the research performed on data from the National Survey of ACOs (Comfort et al., 2018).

Pay for Performance

The research problem focuses on improved quality as it relates to provider treatment behavior and decision-making directly correlates with pay for performance (P4P) incentive models of public programs in place as reformed payment strategies. Quality has been the focus of several studies linked to P4P models supporting value-based care. Bardach et al. (2013) performed a mixed effects logistic regression using a cluster of patients to determine the effect of P4P incentive and the quality improvement initiative in a small medical office with access to electronic medical records. The usage of the P4P incentives delivered weak improvements of clinical processes and health outcomes (Bardach et al., 2013). In an environment that traditionally delivers no reward, yet applies loss or punishment to errors, the P4P incentive system has produced positive effects on provider behavior, implying a systematic flaw within incentive structure (Abduljawad & Al-Assaf, 2011; Peterson et al., 2006). However, incentives differ in the strength of size given the monetary value of the incentive. Influence is varying based on providers values and ethics, as well as intrinsic motivations to perform their job well culminating into the provider's behavior in medical decision-making (Rodwin, 2004).

The goal of the P4P model is to improve measures specific to quality and efficiency of care, including the reduction of excessive costs as a value-based model rewards providers or facilities for meeting contracted performance measures (Abduljawad & Al-Assaf, 2011). Existing P4P research is limited by research focus. This

research is challenged by small sample sizes, the variability of data further limited by setting, incentive size, specific conditions and disease focus (Emmert, Eijkenaar, Kemter, Esslinger & Schoffski, 2012; Layton & Ryan, 2015; Scott et al., 2016).

Salisbury-Afshar (2012) questioned whether P4P financial incentives improve the quality of care delivered in the primary care setting. Insufficient evidence in Salisbury-Afshar's research neither supports nor denies that improved quality occurs with use of financial incentives in an empirical review of seven studies, six had moderately positive effects on quality, and a single study found no effects.

Applying metrics of quality to performance provides enhanced health outcomes with little evidence on the cost-effectiveness of P4P incentive methods, supporting the need to find scholarly connections to pertinent quality measures directly correlate to health outcomes and related expenses (Meacock, Kristensen, & Sutton, 2014). Meacock et al. (2014) found that incentives produced statistically significant reductions of mortality rates and length of stay days (LOS) of inpatient care, due to the shorter LOS's, savings increased but incentive effectiveness lacks strength to promote enhanced provider behavior.

ACOs and Performance

Shaping and aligning financial incentive model design to be responsive to changes in real time is vital in the operational success of an ACOs infrastructure, further improving quality by implementing standardize processes with a competitively appealing incentive size to motivate provider treatment behavior (Kronick et al., 2015). The effect of financial incentives on ACO performance is dependent on the relative impact of the

price effect and the crowding out level; however, when the incentive is too great, it becomes disproportionate and can conflict with cognitive medical making abilities of the provider. However, the use of penalties as a tool counteracts this effect (Arnold, 2016; Kao, 2015). With use of the VBPIT, a robust incentive will ensure that provider intentions appeal ethically to deliver health care with the appropriate level of attention, optimizing the resources and applying a base of expectations to support the operational structure of the ACO influencing its performance (Conrad, 2015; Kao, 2015). Scott et al.(2016) research reviewed 22 of 44 schemes that reported incentives size bonuses and monetary penalties for unreached quality benchmarks. The regression model showed no relationship between incentive size and positive health outcomes, yet the authors provide valid points for this unexpected result (Scott et al., 2016). Influencing factors directly or indirectly affecting quality surround methodological limitations, inconsistent incentive design or size, and the lack of quantitative academic rigor (Scott et al., 2016). The factors contributing to the likelihood or probability of the method or scheme have a significant effect, factors which include rules of incentive use, scheme development, existing quality improvement initiatives and public reporting (Scott et al., 2016).

Market factors linked to financial performance of ACOs participating in the Medicare APM programs were examined by Ouayogode, Colla, and Lewis (2017) using the same CMS database used in this dissertation. A number of infrastructure factors and program components were studied including but not limited to quality and standard process improvements, CMS benchmarks, physician performance management, beneficiary characteristics and exposure to contractual risk experience (Ouayogode et al.,

2017). The study's two focused outcomes of performance are per capita savings and shared savings incentive payments. It was found that incentive size and larger benchmarks generated larger shared savings, additionally none of the infrastructure factors or ACO characteristics was significantly linked to either of the outcomes measured; organizational infrastructure cannot predict performance. Findings suggest that prior experience with risk-based contracts did show savings, the ability and knowledge of the contractual model impacted performance and adherence to the program (Ouayogode et al., 2017).

Spending and benchmark targets were a focal point in Ouayogode et al. (2017) study also linking Medicare claims data of 250 MSSP or Pioneer ACO contracts in 2012 or 2013. Correlating with findings of McWilliams et al. (2016), Rose, Zaslavsky, and McWilliams (2016) also found little saving beyond year one of either APM program. Rose et al. compared spending patterns of ACO patients and non-ACO patients. Sensitivity of benchmarks is clear in the findings found variations in spending across all groups but the per capita expenditure patterns of the two studied groups was found to be similar. Rose et al. results imply a larger transition of benchmark methodology is needed, supporting national preset benchmarks as opposed to the rebasing mechanism currently; predetermined benchmarks would be more effective.

One study used hospitals as the setting which focused on reformed incentives, offering hospitals an opportunity to earn the incentives and in return these hospitals had the largest performance-based improvements (Werner et al., 2011). Werner et al. (2011) in that same study found that larger incentives provided to hospitals yielded greater

improvements in performance. Incentives that are considered too small will not encourage effective provider motivation. Only those incentives with a suitable size will alter the behavior of the provider to promote improved care (Jha, 2013). Layton and Ryan (2015) link the behavioral economic components of the VBPIT. This is an indication that large financial incentives motivate heightened performance when standardized assessments and processes are applied and bound by contractual arrangements. In comparison to an approach completely lacking incentives, small incentives also resulted in poor performance, an outcome that behavioral economics and the VBPIT both predict (Layton & Ryan, 2015).

Every author approaches the problem of consistent quality of care in health care differently based on perspective, methodology, and theory. The strengths and weaknesses are acknowledged as a means to probe justification of a study's design, method, structure, validity, reliability, and theoretical frame. Nyweide et al. (2015) presented data on Pioneer ACO model as opposed to the MSSP, theoretically implying the ACO model will reduce costs and uses based on data from 2012 and 2013, the start of the ACO implementation. With regard to achieving maximized sustainability in a program, there is little to no evidence to determine the most effective incentive design, or the nature of optimal reward size, definitions (flat or tiered), quality alignment, and payment distribution (Meacock et al., 2014). Torchiana et al. (2013) studied incentive influence on hospital-based primary care practices that implemented defined processes promoting access and linking incentives to lower ED visits. Results of the incentive influence on care was a 3.7% decrease in utilization of the emergency department per 1,000 primary

care patients between 2009 and 2010, but within an overall decrease of 18% in that same temporal allotment (Torchiana et al., 2013).

McWilliams et al. (2013) used Medicare claims data from 2009 (pre-ACA). Its aim was CPT's evaluation and management postacute care visits. Because the study focused its population on ACO Medicare, the findings can be aligned with readmissions data unrelated to the MSSP. Primary care visits researched by Salisbury-Afshar (2012) focused on quality of care delivered in the primary care setting. They found that when incentives are used to enhance provider behavior, quality is influenced. Salisbury-Afshar found little correlation between improved quality and incentives in the literature-based data search without focus on a single program. However, because the data were consistent with types of incentives that have improved care, such as patient population features and the characteristics of the provider delivering care, the study does offer insight into potential financial incentive structures.

Quality linked to incentives in a P4P strategy was the theme of several studies (James 2012; Meacock et al., 2014; Werner et al., 2011). These studies contained no correlations to VBPIT, ACOs or MSSPs. Colla et al.'s (2016) study aimed at ACO contracts specifically correlating with the performed research and defining characteristics were "accountable" quality and expenses of clinically vulnerable patients, aligned with the study's ACO subpopulation of Medicare beneficiaries. McWilliams et al. (2013) studied the commercial ACO setting under an alternative quality contract and the ACOs association with reduced spending, enhanced quality for Medicare beneficiaries and preventable readmissions. Findings show great potential for alignment of contractual

incentive size and infrastructure to advance health care quality and lower expenditures for a clinically vulnerable population experiencing elevated occurrence of chronic conditions.

Summary and Conclusions

Several emerging themes surface in the literature review associated with ACO performance and incentive size, incentive design and operational infrastructure. Supported by Kao (2015) and Conrad's VBPIT (2015), incentive design must intrinsically align the size of the incentive which varies based on payment mechanism; fee-for service, capitated, bundled or value-based payment to produce higher quality of care. Balanced incentives are not just a one-size-fits all payment solution. Each payment mechanism varies in its functional alignment and application to the financial incentive, pairing the incentive to the delivery environment requires sliding payment strategies to produce the most effective payment mechanism (Conrad, 2015). Nevertheless, payment mechanism is not in the scope of this study. The scope of this study specifically tests the value-based payment mechanism as applied to the MSSP via the CMS, as this is the emerging payment trend among federal APMs currently utilized in the delivery of care (Burns, 2103). The MSSP has a shared-savings or bundled payment concept of incentivized behavior that reinforces services through a team-based approach to ACOs.

Furthermore, undermining the provider's abilities and autonomy leads to inferior performance (Kao, 2015). Typically, the supply and demand balance shows that incentive payments improve performance, the crowding out occurrence functions atypically on financial incentives indicating that the size of the incentive is linked to work performance

(Kao, 2015). Correlating counterparts of design and structure support a comprehensive operational infrastructure through the alignment of clinical processes vital in the development of an effective payment reform strategy sustaining a successful ACO design (Fisher et al., 2012). Additionally, the Pioneer and MSSP APMs utilized in ACOs are improving quality through targeted health outcomes which also enhanced infrastructure and applied incentive initiatives (O'Donnell et al., 2015). According to Rose et al. (2016), after dissolving the current MSSP benchmark rebasing method, provider incentives would strengthen provider motivation through targeted provider-decision making behavior that reduces costs and induces savings.

The *crowding out* concept of undermining intrinsic motivation when extrinsic influence supersedes the outcome, the application of the phenomenon has not been studied in ACO providers (Kao, 2015). The proper extrinsic incentive size balanced with intrinsic motivation promotes improved quality through universal clinical processes embedded in the ACOs infrastructure that rewards efficient provider treatment behavior and complex decision making essential in developing a successful ACO (Fisher et al., 2012; Kronick et al., 2015; Lee et al., 2013; Petersen et al., 2006). Effective payment incentive structure further ensures comprehensive and coordinated services that result in improved quality of care. Additionally, studies to date focusing on incentive value have only analyzed percentages not dollar amount. The presented literature reveals a lack of knowledge and empirical support on the relationship between MSSP's incentive size and ACO performance (quality) as a method to improve utilization of resources and per capita spending, acute readmissions and emergency department visit rates for the ACO

participant population. There are no existing literature correlations between the ACO performance and the variables chosen. Scott et al. (2016) and Werner et al. (2012) stated that no study has examined the differences and the impact of incentive size within a single payment program, such as the MSSP, directly affects quality improvement.

Conclusions can be deducted in relation to ACO performance and quality of care from the reviewed literature, despite of the deficiency in incentive size research and MSSP APM correlations to ACO success. Health care spending slowed with use of Medicare's ACO strategies, quality levels were inconsistent among this same population of beneficiaries, and only short-term effects are evident of ACOs spending trends (Nyweide et al., 2015; Scott et al., 2016; Williams et al., 2014; Williams et al., 2015). Basic incentive design is not inclusively or comprehensively researched, many studies have reported that incentive models lacked details on clarity of incentive size, threshold payments, and rules of use of the incentive (Scott et al., 2016).

Researchers found mixed and unfavorable outcomes when attempting to determine if a relationship existed between pay-for-performance rewards and quality of care (James, 2012; Layton & Ryan, 2015). Savings occurred between 2012 and 2013 under the Pioneer ACO program (value-based payment scheme) and in Blue Cross Blue Shield of Massachusetts' AQC; a commercial ACO however, sustainability of reliable quality is unknown (McWilliams et al., 2013; Nyweide et al., 2015). Behavioral economics has not been significantly applied to physician performance and decision-making when using financial incentives, meaning the extent to which incentive design impacts extrinsic rewards aligned with the providers' intrinsic values persists as a

question (Khullar et al., 2015).

Limited research has focused on rewarding behavior with the appropriate incentive size in place to produce improved ACO performance, but is linked to provider performance (Collet, 2011). Results of the research have the potential to contribute to the VBPIT and in the balance of incentive size to optimize health outcomes, controlling expenses, and maintain reliably universal quality of care (Kao, 2015).

Knowledge of behavioral economics, as applied in the VBPIT applied to the potential *crowding out* of provider behavior, adds quantitatively to the application of a successful ACO infrastructure, financial incentive design, and reformulated collaborative care. A sturdily-balanced incentive strategy can produce effective changes in provider treatment behaviors and promote collaborative decision-making. This balance sets the foundation for standard universal clinical processes outlined and regulated by contractual quality benchmarks.

Chapter 3: Research Methods

Introduction

The purpose of this study was to investigate the misalignment between financial incentives and ACO performance. Apprehensions lie in the ability of financial incentives to efficiently stimulate and motivate providers to make consumer-conscious decisions in the continuity and coordination of practices that strengthen the quality of health care. My overall intent with the study was to determine whether there is a relationship between the financial incentive size and the quality-defined performance of an ACO contracted to serve the Medicare population. A gap in knowledge exists in the empirical literature surrounding APMs, more specifically financial incentive models developed by CMS meant to control costs and improve quality.

All existing studies aimed at financial incentive strength have applied a percentage approach to determine impact on provider behavioral/performance changes. To date, there have been few studies that have tested the incentive value impact on received dollar amounts of the incentivized bonus. With an additional gap in the lack of quantifiable data in this area, whether the value of the incentive size used in the CMS programs is influential enough to alter the performance of a provider and improve the provider's ability to streamline patient care remained to be determined.

In this chapter, I will describe the developed methodology I used to examine a defined sample of ACOs engaged in the reformed incentive structure models implemented by the CMS under the ACA (2010) I used secondary data for this study. I will also present the data analysis plan, which aligned the research questions and

hypotheses, targeting incentive size as a predictor of ACO performance in several regression models.

Quantitative research uses deductions reliant on statistical analysis to determine the significance of a tested relationship between the predictor and response variables (see Creswell, 2009). My theoretical framework of the VBPIT supported the research questions and hypotheses crafted to focus on explaining the phenomenon examined in the study. I tested the hypotheses to determine the significance of the data collected via the public access files from the CMS of the MSSP ACOs. While analyzing the data for statistical significance, I used analytical tools to assist in determining relationship strength and the probability of Type I and II errors (see Field, 2013).

Research Design and Rationale

In this study, I used a quantitative approach, applying a cross-sectional design (or correlational design) to the research in an attempt to describe the potential associations between the presented variables. A quantitative strategy provides an objective perspective of the use of secondary data in a study as applied in a correlational design (Creswell, 2015). This design does not require random assignment in sampling because the independent variable is not manipulated (Frankfort-Nachmias et al., 2015). The ACO environment was uncontrolled and data are collected once annually by the CMS (CMS, 2017). The defining characteristics of this study aligned best with a cross-sectional design (Frankfort-Nachmias et al., 2015).

I hypothesized the independent (or predictor) variable in this study, incentive size, to have a predictive relationship with the dependent variables. These dependent variables

were acute care readmissions, outpatient ED visits, and total spending per year in ACOs functioning under the MSSP. The control (or potential confounding) variables for the research included organizational and population characteristics: ACOs contracted with participating hospitals, ACO size, Medicare recipients 85 years old and older, and African American and Hispanic populations. The health disparities of these two racial groups are elevated comparatively. Extraneous variables are controlled for in the linear regression equations to avoid alternative explanation of the results (Russell, 2010). Upstream determinants are defined as components of an individual's social environment; this includes the socio-economic status that essentially influences a person's behavior, disease prevalence, and overall health status (Gehlert et al., 2008). African American and Hispanic populations are less likely to have health insurance resulting in poorer health with some of the highest incidence rates of cancer, diabetes, and heart disease (Russell, 2010). Each of these extraneous variables contributed to the internal validity of the study.

Two core features of the correlational, cross-sectional design are: (a) the ability to allow researchers to perform the study in a real-world setting or in its natural environment, thereby increasing external validity and (b) sampling does not require random assignment (Frankfort-Nachmias et al., 2015). A cross-sectional design allows for flexibility in selecting a sample that is most applicable and generalizable to the research questions. The quasi-experimental design closely aligns with the goals of the experiment, but the cross-sectional design uses a statistical data analysis to determine the relationship among variables where incentive size is not manipulated (see Creswell, 2015).

The internal validity of the study is susceptible to the weaknesses of the cross-sectional design. Cross-sectional designs are challenged with weak control but are balanced with strong representation, allowing the researcher to make statistical inferences to a larger population expanding the ability to generalize findings (Frankfort-Nachmias et al., 2015). This design type creates operational boundaries in its inability to manipulate the incentive size; I hypothesized it to be a predictor of ACO MSSP performance in this study (see Frankfort-Nachmias & Nachmias, 2008).

I centralized the research questions in this study around collecting data extracted from a natural environment that could be used to measure any existing variable relationships (see Creswell, 2015; Frankfort-Nachmias et al., 2015). The performance outcomes I investigated in this study included the frequency of acute care readmissions and the occurrence of ED visits not resulting in admissions, variables which could reflect that care or its quality was unreliable in the delivery of services and treatment. The use of hospital-related services under fee-for-services may be substantially higher than an APM of care aligned with an efficient and comprehensive ACO provider care, which motivates the choice of the final dependent variable: total expenditures of MSSP contracted Medicare beneficiaries.

If I found a relationship between variables in this cross-sectional study, causation would not be implied. Statistical data analysis additionally informs the researcher of a positive or inverse correlation between variables (Creswell, 2015). In the correlation of variables, positive correlation occurs when the rise of one variable prompts a rise in another variable, and both variables will increase (Field, 2013). An inverse correlation is

when the rise in one variable results in the drop of another or reversed variable (Field, 2013).

The purpose of the control variables is to manage the external influence from confounding or extraneous factors and to help identify outliers that may skew the statistical data analysis (Creswell, 2015). I used seven control variables in this study. By controlling for these potentially confounding factors in the research, a researcher reduces the risk of inaccurately attributing the association between the independent and dependent variables to these factors, thereby improving statistical validity of the models (Frankfort-Nachmias et al., 2015). Multivariable-adjusted regression statistical models are able to minimize confounding if the relevant confounding factors were measured during data collection (Pourhoseingholi, Baghestano, & Vahedi, 2012).

Methodology

The target population of this study was ACOs participating in the MSSP, and the unit of analysis was the ACO. Participating ACOs serve no less than 5,000 beneficiaries as per the criteria of the program (CMS, 2016). This population can be defined as individuals 65 years and older who are temporarily or permanently disabled and those with kidney failure (ESRD). These recipients are assigned to an ACO contracted by CMS to meet their health care needs. In the 2015 MSSP, ACO performances were captured for 348 ACOs actively participating in the CMS's APM initiative under Tracks 1 and 2. Each ACO serves thousands of Medicare beneficiaries (CMS, 2016). These ACOs are contracted with CMS to meet quality-specific benchmarks and provide alternative

payment options inclusive in the use of financial incentives (CMS, 2016). The aim of this study was to determine the MSSP incentive value.

Sample Size and Power Analysis

The unit of analysis in this study was ACOs contracted under the MSSP to serve the Medicare population. I used secondary data for the independent and dependent variables in the ACO dataset. CMS data include quality-focused performance measures linked to performance standards of ACOs contracted to meet or exceed defined benchmark goals. Data are systematically collected and analyzed, with annual updates producing associated risk scores impacting ACO financial rewards and balancing validity and quality of care with consideration of the fluctuating levels of individual health risks (see Frankfort-Nachmias & Nachmias, 2008). In this nonexperimental study of ACOs contracted with the CMS to deliver quality health care nationally, the sampling unit was a single ACO. I refined the focus of the sampling frame to specifically include MSSP participating ACOs.

Power is influenced by three factors in research: the effect size, the alpha level, and sample size (Burkholder, n.d.; Field, 2013). The alpha level should be kept small to avoid Type I error; this error occurs when the null hypothesis is true but rejected, showing significant effects of the independent variable (in this study, incentive size), when none exists (Frankfort-Nachmias et al., 2015). The larger the alpha value, the greater the region of probability is to reject the null hypothesis (Burkholder, n.d.). Setting the alpha level at 95% translates to only a 5% chance for a Type I error of inaccurately rejecting the null hypothesis. The stronger or larger the power is, the smaller the

probability of a Type II error occurring in the research (Burkholder, n.d). The power is the ability of the statistical test to identify a relationship, indicating 80% of the time the null hypothesis will be rejected (Field, 2013).

I performed a G*Power calculation based on the defined input parameters described using eight covariates. Under the *F* test family, the linear multiple regression: fixed model, R^2 deviation from zero statistical test is selected using an a priori analysis to determine adequate sample size at 80% power (see Field, 2013). Given that this study included three dependent variables, a Bonferroni's correction was applied. A Bonferroni correction is applied to the alpha (α) as a strategy to control for Type I errors in the multiple regression tests of a study (Field, 2013). In the correction, alpha is divided by three (α/3), correcting the error of probability to .0167 in the calculation (see Field, 2013).

An a priori power calculation was performed using G*Power (2017) based on a Bonferroni-correct alpha of .017, a medium effect size (f^2) of .15, a power selection of .80 for an eight independent variable regression model. The power calculation resulted in a minimum sample size requirement of 136. Given the 348 participating ACOs and these parameters, the study will have sufficient power. The sample of this study is set at N = 348, surpassing the minimum required sample size to achieve the desired power of the predictive relationship.

Archival Data

My study used archival or secondary data. The CMS 2015 MSSP ACO public use file was the source of data for this study, accompanied by the database code book

identifying and outlining all study selected variables. Data collection procedures included accessing the 2015 SSP ACO PUF via the CMS website, then downloading the 2015 database file in Excel and the companion code book of variable definitions used in the database. There are no required permissions necessary to access this public data. The MSSP is a public program provided to Medicare recipients. It is developed and implemented by CMS, which uses accountable improvement strategies to align quality, cost, and access to care for this segment of the population. The SSP ACO Excel PUF dataset is a standard analytical file of ACO-specific measures, with recipient and provider content per performance year of the program (CMS, 2016).

Each contracted ACO provides data to the CMS that is merged into one complete dataset of metrics of quality and performance. Data collected are organized and used to calculate quality. They are also used to determine if quality benchmarks are met, initiating a possible bonus or penalty to the ACO or directly to the provider. The data provided in the PUF are unobtrusive of the patient's privacy. Values are collected with minimal bias and without identifiable patient information impeding the study. There are no identifiable characteristics of the ACOs or their recipients in the reported information from the CMS database that would lead to bias in data collection. Bias can occur at several stages of research, bias in data collection and analysis in this study surfaces potential concerns with obstacles in the study's validity. Potential performance bias exists in the diversity of provider behavior when delivering care according to the CMS quality metrics defined as performance measures for ACOs (RTI International, 2015).

Variable Operationalization

Incentive size. The CMS SSP ACO PUF includes the total benchmark expenditures (TBE) variable and is a proxy for incentive size in this study. TBE are the total dollar amount spent per person per year or ACO health care expenses calculated using a risk-adjustment model per beneficiary (CMS, 2016). This continuous variable is defined on an interval numbering scale; the variable provides a monetary scale of measure based on absolute zero (Field, 2013). This variable identifies the difference in money saved given the opportunity to earn greater bonuses that align ACO performance with incentive size, incentive size being the independent/predictor variable of this study.

ACO performance. Acute care readmissions are identified as the variable labeled readm_Rate_1000; this continuous variable represents the total number of acute care readmissions (all-cause-30 day) per 1,000 discharges of the ACO population (CMS, 2016). Disease severity can contribute to the rate of readmissions. The greater number of chronic conditions or a poorer health status of a participant can increase the usage of a resource, this includes expenditures related to readmissions and ED visits (Colla et al., 2016). Performance of an ACO can be interpreted in many ways, in the scope of this study the readmission rates represent additional expenses for this population, and thus controlling for these adversely severe conditions can provide control over their individual influence on health outcome statistics of an ACO (Colla et al., 2016; Nyweide et al., 2015).

Outpatient emergency department visits per 1,000 beneficiaries can be measured by the P_EDV_VIS continuous variable in the file, displaying an ACO recipients'

frequency of the ED use without admission (CMS, 2016). Given the team-based approach to comprehensive care in this setting, implications of this are expenses generated from these visits, where readmissions and ED visits are preventable in nature provided the care being delivered by the ACO is responsive, coordinated, and directly linked to ACO performance (Colla et al., 2016; Nyweide et al., 2015). The final dependent variable is the per capita expenditures of the ACO Medicare population. This variable was initially coded as ABtotExp in the dataset and is measured as the per member expenditures weighted by the assigned recipient proportions for all Medicare enrollment types in the performance period in a given ACO (CMS, 2016).

The original variable identified to represent per capita spending was measuring the same data as incentive size according to initial statistical findings, therefore the variable shifted from "total performance year spending per assigned beneficiary" or ABtotEXP to "total expenditures per assigned AGED/NON-DUAL beneficiary" or Per_Capita_Exp_ALL_AGND. This variable is deemed continuous in nature (Field, 2013).

Control (potential confounding) variables. Control variables are introduced to adjust for confounding factors. The control variables include the number of Medicare beneficiaries age 85 years old or older (N_Ben_Age_85plus), African Americans (N_Ben_Race_Black) and Hispanics (N_Ben_Race_Hisp), ACO size (N_AB), males (N_BEN_Male), the disabled (N_AB_Year_DIS) and ACO hospital affiliation status. The number of those aged 85+, the number of African Americans and Hispanics in ACOs, the number of beneficiaries participating (size) and the number hospitals

contracted to deliver care via the ACO setting are captured. The number of recipients aged 85 years old and older as of January 1, 2013, were included in the dataset. These individuals identified present a possible threat to variable consistency; those at this age are mostly likely to be chronically ill demanding costly services making their per capita account of health-related expenditures higher (CMS, 2015). All control variables are continuous data (CMS, 2015). The number of participants identified as African American (i.e., race = 2) and Hispanic (i.e., race = 5) is captured in the CMS PUF dataset (CMS, 2015). Traditionally, these races have less access to health care based on socio-economic factors, such as income and education level (Lee, 2015). These patients absorb more health resources, as their lack of preventative care and prolonged access to treatment leads to greater resource usage and higher expenditures. These races were controlled for as they can extraneously influence outcome measures given their level of disease severity as a result of health disparities these races face prior to age 65. Disease severity is represented by a combination of control variables including age (85 +), race (Hispanics & African Americans), gender (Male), and disability status. These variables assist in controlling for confounding effects in the study of diverse disease severity of the studied population.

The sicker patients consume more resources such as the hospital's emergency department and increases hospital readmissions, hence the need to control for these expenses that present as outside the norm. The "total number of assigned beneficiaries per performance year" is recognized as N_AB in the codebook and is defined as a continuous variable. This variable includes the number of assigned beneficiaries per

ACO, controlling for diversity in size among ACOs participating in the MSSP (CMS, 2015). Disease severity also contributes significantly to expenditures; this requires control of additional confounding factors and potential influence of Medicare's clinically vulnerable subpopulation with proxies assigned to gender (N_BEN_Male) and those with disabilities (N_AB_Year_DIS) (CMS, 2015). Health outcomes can be confounded by both gender and disabilities, responsible for increased provider attention and a greater proportion of expenses. Gender is identified as a categorical (binary) covariate in this socialized category of Medicare; this variable represents the total number of male beneficiaries in 2015 enrolled in the MSSP (CMS, 2105). The National Institute of Health defines the clinically vulnerable as aged and disabled, with the disabled plagued with multiple chronic conditions; this study merges these variables as representatives of disease severity (Colla et al., 2016).

Hospital affiliation is represented in the dataset by the combined number of N_CAH and N_ETA hospitals included in the dataset (CMS, 2016). These two types of hospitals are contracted with local ACOs to provide coordinated care in response to acute readmissions, The N_CAH variable includes all Level II critical access facilities and N_ETA captures all elected teaching hospitals contracted with an ACO to assist in delivering preventative and comprehensive services in outpatient setting with modifying attribution of beneficiaries (CMS, 2016). The ED frequency of ACO beneficiaries included in the MSSP and is one of three dependent variables studied. Readmission and ED frequency rates can both be linked to the hospital affiliation (a controlled variable)

and its potential influence on the outcome of the study, with economically- or competitively-influenced decision-making.

Table 1

Variables by Type and Scale

Continuous Variable Types
Predictor Variable –IV
Incentive Size (dollar amount)
Response Variables –DVs
Acute Readmissions
ED visits
Per Capita Expenditures
Continuous Control Variables
Risk Adjustment Controls
Number of ACO beneficiaries age 85+
Number of ACO beneficiaries of Hispanic ethnicity
Number of ACO beneficiaries of African American ethnicity
Number of Male ACO beneficiaries
Number of Disabled ACO beneficiaries
Categorical Control Variables
Operational Structure Controls
Hospital Affiliation
ACO Size (number of ACO beneficiaries)
Group 1 = 0 – 8,500
Group 2 = 8,501 – 22,500
Group 3 = 22,501 +

After reevaluation of the MSSP PUF data set variables selected changes occurred. An alternative per capita spending variable was selected that would be a more conducive match for the variable being tested. Assumptions were violated, heteroscedasticity, and non-linearity occurred for all dependent variables, thus a transformation was performed to adjust data. All three dependent variables were transformed via the Box-Cox

calculation and the covariates measuring the number of Hispanics, African Americans, Disabled, aged 85+, and males were converted to percentages to normalize relation to 100 given the larger database size. Compared to log, inverse, or square root transformations, Box-Cox transforms residual data by searching for the most appropriate lambda (-5 to 5) value to best approximately normalize data and improve validity (Osborne, 2010). Additionally, ACO size category perspective was altered to improve multicollinearity. The ACO size was organized into three groups based on the number of assigned beneficiaries; ACOs were assigned as falling into one of three size categories; small (Group 1 = 0 – 8,500), medium (Group 2 = 8,501 – 22,500) and large (Group 3 = 22,501 +). These changes assist in meeting the regression assumptions.

Data Analysis Plan

The collection of data is used to craft a more accurate and minimally biased statistical analysis to test the multiple hypotheses. IBM SPSS Version 23 statistical software was used to analyze the study's predictor (independent [IV]), criterion (dependent [DV]) and control variables. Multiple statistical analyses were completed between the incentive size (IV) and acute readmission rates, outpatient ED visits and per capita expenditures (DVs) of the ACO MSSP population to determine if a relationship is present.

Sample Population Description and Representation

A total of 348 ACOs contracted under the MSSP defines the sample tested in the research presented. The entire ACO PUF included three alternative payment strategies utilized by CMS in 2015. Data from Track Models 1 and 2 are included with the

omission of the advanced payment model from the sample. Each of the sampled ACOs includes a range of assigned Medicare beneficiaries within the 10 national regions, which are defined by CMS (CMS, 2017). Medicare beneficiaries are defined as either aged 65 or older, disabled, or having end stage renal disease (ESRD; CMS, 2017). These regional ACOs serve a population size ranging from 147,852 (among nine ACOs in Region 10) to 1.7 million (among 135 ACOs in Region 4) actively participating beneficiaries (CMS, 2017). Beneficiaries of the MSSP participating population are statistically represented in the sample in terms of socioeconomic diversities and the effects of disease severity on health outcomes of specific population groups. As the gap between health status disparities begin to narrow at age 65, chronic conditions begin to increase and characteristics of these disparities shift an individual's health status. The sample tested and analyzed contains a variety of health statuses respective of the population, supporting research controlling for confounding socioeconomic factors related to racial disparities, disease severity, age (85+), and ACO population diversity.

The dataset was cleaned and screened for potential data outliers of the study by using a scatter plot. ACOs participating in the advanced payment model payment reform program were omitted from the sample as this program offers different incentive modes and strategies. Advanced payment models work on the basis of a different motivational concept. Raw data is reduced to the conformed version of the utilized data set, extracting the data identified as the independent and dependent variables. Multiple linear regression was applied in the analysis of data.

Research questions. The following research questions were addressed in the

study.

Research Question 1: How does the MSSP value-based incentive size relate to the ACOs' performance on acute care readmission rates?

Research Question 2: How does the MSSP value-based incentive size relate to the ACOs' performance on the frequency of ED visits that do not result in a hospital admission?

Research Question 3: What is the association between the MSSP value-based incentive size and the performance year spending per ACO Medicare beneficiaries?

Hypotheses.

$H_0$1: There is no statistical relationship between the incentive size of the MSSP and acute care readmission rates in an ACO setting.

$H_1$1: There is a statistical relationship between the incentive size of the MSSP and acute care readmission rates in an ACO setting.

$H_0$2: There is no statistical relationship between the incentive size of the MSSP and ED visits in an ACO setting.

$H_1$2: There is a statistical relationship between the incentive size of the MSSP and ED visits in an ACO setting.

$H_0$3: There is no statistical relationship between the incentive size of the MSSP and per capita expenditures in an ACO setting.

$H_1$3: There is a statistical relationship between the incentive size of the MSSP and per capita expenditures in an ACO setting.

Descriptive statistics provide quantifiable outcomes from which to describe and interpret collected data (Trochin, 2006). This study is defined as cross-sectional with one predictor, three criterions, and seven control variables. Parametric statistics are applied to data assuming there is normal distribution. Assuming values are normally distributed; supplementary information is captured through parametric statistics of the mean and the standard deviation (Simpson, 2015). The mean is the mathematic average of the values per variable and standard deviation shows the dispersion of the values surrounding the mean, this is seen in a scatter plot (Simpson, 2015).

For linear regression, it is assumed that the predictor and outcome variables are normally distributed in the population; the second assumption is that a random sample was generated where variable scores are independent of other scores (Salkind & Green, 2014). The Durbin-Watson statistic evaluates the assumptions of the regression model. Serial correlations between errors can be tested for with the Durbin-Watson test to determine if independence is violated, this value should be between 1.5 and 2.5 (Field, 2015).

A scatter plot was created for each DV allowing for visualization of the mean and standard deviation of the values report. Scatter plots for each DV generated showed multivariate categories in relation to all variables, providing structure to the analysis of correlation coefficients. Initially the ACO MSSP data presented a nonnormal distribution of all DV values, thus a transformation calculation was performed converting data into a normal distribution. When there are extreme outliers and when the nature of the variables produces nonnormality two steps are taken. Firstly, data input is reviewed for errors that

may have led to computation inaccuracies. Secondly, normality can be accomplished by applying a power transformation test to the data thus raising data to an exponential power.

This study utilized a Box-Cox transformation to convert data in the event of a non-normal distribution (Osborne, 2010). The Box-Cox transformation improved normality by adjusting data, while also correcting for nonlinearity and heteroscedasicity (Osborne, 2010). A normal probability plot was performed after Box-Cox transformation of standard residuals for all DVs, which verified that the assumption of normality was met, further controlling for residual errors.

The Box-Cox transformation formula is;

$$y(\lambda) = \begin{cases} \frac{y^{\lambda}-1}{\lambda}, & \text{if } \lambda \neq 0; \\ \log y, & \text{if } \lambda = 0. \end{cases}$$

(Osborne, 2010)

A scatter plot showed a linear relationship in the form of a line applying a single predictor or plane with several predictors as in the study's multiple regression tests post transformation (Field, 2013). The relationship of variables is shown in the scatter plot indicating the incentive size's predictability for each DV among correlating variables. Additionally, an SPSS generated scatter plot provided for the three multiple linear regression tests inclusive of the DVs, IV, and the control variables (covariates). Residuals identified in the produced scatter plot showed unequal variances, outliers, and nonlinearity (Field, 2013).

Additionally, remaining assumptions were tested on transformed data. Independence and homoscedasticity must also be assumed. Homoscedasticity assumes

that the predictor residuals have similar variances; violation of this assumption invalidates the confidence intervals and t-test (Field, 2013). Collinearity diagnostics were run producing variance inflation factors per DV and outliers were identified using Cook's distance showing the influence of a predictor variable on the DV (Field, 2013). Heteroscedasticity was evaluated on transformed data after the removal of identified outliers with the White's test per each DV (Field, 2013).

The hypotheses were tested by running a set of multiple linear regression models to determine if a relationship exists between incentive size (predictor) and acute care readmission rates, the frequency of outpatient ED visits and per capita expenditures (criterions) of ACO beneficiaries. The multiple linear regression tests adjusted for confounding factors by using control variables. Controlled variables are intertwined in the statistical data to control them from influencing outcomes.

For each research question, regression tests were performed, a set of three multiple regression tests were conducted. These multiple linear regressions were conducted to estimate the relationship between incentive size and each dependent variable, including the controlled variables (i.e., multivariable-adjusted models).

Multiple regression analyses were executed for each of the three dependent variables and the single independent variable with the inclusion of control variables. The multiple regression model equations for this presented study are formulated and adapted below.

$$\hat{Y}_{DV} = b_0 + b_{IV}X_1 + b_{2\ \text{control variable}\ 2} + b_{3\ \text{control variable}\ 3} + b_{4\ \text{control variable}\ 4} + b_{5\ \text{control variable}5} + b_{6\ \text{control variable}\ 6} + b_{7\ \text{control variable}\ 7} + b_{8\ \text{control variable}\ 8} + \varepsilon i$$

Per capita expenditures = b_0+ $b_{1\ \text{incentive size}\ 1}$+ $b_{2\ \text{African Americans}\ 2}$+ $b_{3\ \text{Hispanic}\ 3}$+ $b_{4\ \text{aged 85}\ 4}$+ $b_{5\ \text{Hospital Affiliation}5}$ + $b_{6\ \text{ACO size}\ 6}$ + $b_{7\ \text{Males}\ 7}$ + $b_{8\ \text{Disabled}\ 8}$ + ε_i

ED visits = b_0+ $b_{1\ \text{incentive size}}$ + $b_{2\ \text{African Americans}\ 2}$+ $b_{3\ \text{Hispanic}\ 3}$+ $b_{4\ \text{aged 85}\ 4}$+ $b_{5\ \text{Hospital Affiliation}5}$ + $b_{6\ \text{ACO size}\ 6}$ + $b_{7\ \text{Males}\ 7}$ + $b_{8\ \text{Disabled}\ 8}$ + ε_i

Acute readmissions = b_0+ $b_{1\ \text{incentive size}}$ + $b_{2\ \text{African Americans}\ 2}$+ $b_{3\ \text{Hispanic}\ 3}$+ $b_{4\ \text{aged 85}\ 4}$+ $b_{5\ \text{Hospital Affiliation}5}$ + $b_{6\ \text{ACO size}\ 6}$ + $b_{7\ \text{Males}\ 7}$ + $b_{8\ \text{Disabled}\ 8}$ + ε_i

ε = random error

b_0 = y intercept

$\hat{Y}$ = dependent variables (criterion)

b_1 = independent variable (predictor)

b_2, b_3, b_4, $b_{5,}$ $b_{6,}$ b_7, b_8 = control variables (covariates)

The statistical analysis of the dependent variables, acute readmission rates, ED visit rates and per capita spending, provided insight on how, and at what level, financial incentives influence the utilization of health resources, directly related to spending and quality of ACO performance. A predictive relationship was tested on the reformed incentive payment value (size) with behavioral correlations of the provider treatment decision-making. Per capita spending and resource expenditures were based on health care usage and are additionally expected to change incentive value (Lee, 2014).

The SPSS multiple linear regression model analysis yielded statistical data outcomes used to analyze predictive correlation outcomes include a summary of data, coefficients, with an ANOVA, a comprehensive model summary, descriptive statistics and correlations. The multiple regression tests required a scatter plot prior to performing

the multiple regression test calculations to determine assumption criteria and normality is met. Various statistical values were produced.

ANOVA tables were produced for the multivariable linear regression. As a result of the regression test performed, SPSS produced a model summary including R^2 designating the level of variance in the model, yielding the portion of the outcome variables shared by the predictor variable. The model fit is represented by the R^2 value; the value provides a quantitative account of variation in the mean number of acute readmissions, ED visits and per capita expenditures predicted by the MSSPs incentive size in the performed regression tests (Field, 2013). In the multiple regression tests, significance (p) is set at 0.05; this value shows the change in F. The F-ratio determines the model's ability to predict the outcome. If the F-ratio value is less than 0.05, findings would be significant, thus concluding that the regression model significantly predicts acute readmission rates, ED visits, and per capita expenditures of MSSP ACOs. If findings indicate a significant relationship the null hypothesis is rejected. The p value or alpha (< 0.05) measures statistically significant relationships and the probability of measuring support against the null hypothesis, smaller p values will indicate stronger evidence (Field, 2013).

Coefficient output produced by the multiple regression tests provided information on the direction (positive or negative) and strength (Pearson Correlation r) to assist in defining the relationship between variables, should one exist (Green & Salkind, 2014). The regression coefficient b signifies a change in the response variable based on a unit change in the incentive size (predictor), thus showing the predictors ability to forecast the

outcome/s (Field, 2013). If statistical significance is present, this implies that the *b* value should be different from zero ($b \neq 0$; Field, 2013). A 95% confidence interval was determined for each DV post transformation, after all assumptions were met.

The independence of observations was determined through the Durbin-Watson value in this model summary as an assumption of regression. The multiple linear regression model was a good fit to measure the covariate's ability to predict the number of acute readmissions, ED visits and per capita spending of MSSP ACOs. The covariates to be tested include the incentive size, and all control variables; aged 85+, ACO size, African Americans, Hispanics, males, disabled beneficiaries and hospitals contracted with ACOs to provide care under the MSSP. A scatter plot was performed with one predictor and seven covariates for each DV, to determine if a linear relationship is present with control of confounding variables. For the multiple regression models, descriptive statistics were produced, inclusive of all covariates to measure the mean per DV and the predictability of incentive size on acute readmissions, ED visits, and per capita expenditures.

In the multiple linear regression models, the ANOVA output includes the F ratio. The F-test determines if the IV predicts the dependent variable when controlling for cofounding variables with an alpha of 0.05 in SPSS calculations. The *F*-test evaluates the null hypothesis, determining if the coefficients are greater than 1 indicating the probability of the outcome occurring due to chance with supporting significance (Field, 2013). This statistic informs the researcher if the null hypothesis is rejected or not rejected. A straight line visually defines the slope of the line (gradient) and at the

intersection of the vertical axis (intercept point) on the graph generating the regression coefficient linearly (Field, 2013).

Threats to Validity

The correlational design applied to this research poses both advantages and disadvantages of validity. Data retrieved from an archival resource, with general public access, empirical evidence supports the choices of measures, and measured benchmarks are directly linked to tasks controllable by the physician or the ACO team from which to determine if quality is met. These defined and measured benchmarks indicate if specific goals have been met in the SSP ACO PUF dataset collected by CMS. While no design is infallible, there are strategies that can be taken to avoid threats to a study's validity. This study did not apply a sample strategy since secondary data was used. The measurement instrument used in the statistical analysis of study's variables is the CMS quality performance standards 33 point nationally recognized quality of measure instrument reporting year end data. The 33 quality measures are a culmination of CMS claims, administrative, CMS web interface including a survey of patient satisfaction data reported annually (RTI, 2015).

Measurement error refers to the variability in deducting the quality specific measures and ensuring that these measures take on meaningful outcomes of provider performance practices in these ACOs. Meaningful use measures have been developed by CMS that best indicate quality of care with newly reformed payment strategies supporting these actions and these benchmarks are universally utilized by all contracted ACOs to report and to ascertain performance data reducing potential measurement error

with indirect use of an instrument by CMS (Frankfort-Nachmias et al., 2015). Measurement error occurs when score variances are due to anything besides factual differences (Frankfort-Nachmias et al., 2015). Temporary changes in political conditions could also influence measurement perception or behavior, creating measurement errors. Recent policy changes have the potential to produce disincentives of the newly reformed alternative payment models (Frankfort-Nachmias et al., 2015).

Due to the inability of correlational designs to show causality, the internal validity of the design is weak. The introduction of control variables protect against findings being attributed to alternative hypotheses; in this aspect, the correlation design is effective. This study utilizes control variables to improve the internal validity of the study's design. The control of these variables contributes to the study's internal validity, so that the outcome cannot be attributed to them as the design is threatened by weak control over extrinsic and intrinsic influences. Causal inferences can be made alternatively when no link to causality if present, but statistical techniques can improve the quality of those inferences in the correlational design (Frankfort-Nachmias et al., 2015). Using control variables in this research helps to strengthen control in the natural setting of the study and generalize the findings to realistic situations. External validity revolves around the ability of the sample to represent the focused population and when the sampled setting is not reflective of the natural setting. External validity is strong, as the sample is inclusive of all participating ACOs in the MSSP.

Mild concerns of statistical validity of the variables are present; threats to validity may reveal incorrect conclusions about variable relationships. Hence, the threat is the

assumption violation of the statistical test performed (Trochim, 2006). A strong statistical power improves conclusion validity; this study uses 80% power and can also be influenced by a larger sample size (Trochim, 2006).

There is potential for omitted-variable bias in the study. If a significantly confounding factor is omitted from the study, the under or over compensation will occur in response to the missing variable (Berkeley Department of Agricultural & Resource Economics, 2015). Omitted-variable bias occurs when a key variable is not included in the regression model performed but correlates with both the independent and dependent variables biasing β (Berkeley Department of Agricultural & Resource Economics, 2015). Examples of omitted variables in this study with the potential to impact the outcomes include the extent of ACO operations management of coordinated care and in incentive design. Each ACO has the autonomy to structure the operational delivery of care to ensure quality; the incentive models provided through federal programs do not define operations of the ACO nor the incentive structure itself (CMS, 2015). The incentive could be absorbed by the ACO or it can be distributed among the clinical team that produced improved readmission rates, reduced ED visits and reduced per capita spending by delivering cost effective treatment and service options. The structure of the ACO operations and the structure of the ACO incentive could have potential influence on the study's outcome and are not included in the variables tested.

Ethical Procedures

The measures taken for protection of participants' rights were maintained by the original data collectors and CMS. Personal identifying information data was removed

from these reports before submission to the CMS dataset. There was no direct contact with Medicare participants or ACO administration form in regard to the data that will be used in this study. There are no formal agreements needed to obtain this archival data from the public access file via the CMS website. There is complete participant anonymity in the dataset. While ACOs are named with addresses, there is no need to contact these organizations for study purposes, as the contract between them and CMS allows this data to be accessed without bias. No informed consent was requested, as data is secondary.

Prior to working with the CMS dataset, the institutional review board approval number 12-06-17-0557409 was obtained from Walden University. No informed consent was required with use of secondary data of unprotected health information, as the database is archival and Medicare recipient data cannot be linked individually.

CMS Archival Database

Secondary data were the single source contributing to the research. The CMS SSP ACO public access file is obtained via the agency's website, through a downloadable zip file. Data utilized in this study will be generated from the 2015 performance year and saved in a Microsoft Excel format (CMS, 2016). This data and research findings will be retained on a secured hard drive. All of the data used in this research will be kept in a password-protected file on a password-protected computer. Once the research is concluded, the data will be destroyed by deleting it from the computer.

Some ethical concerns of the study include competition of private and public insurance organizations or programs. Accountable care organizations may treat privately insured beneficiaries differently with potential conflict of interests that are economically

motivated. As this study has no interventions or treatment data collection tasks that engage any outside individual or organization, there is no foreseeable conflicts of interest impacting the research.

Summary

In this chapter, I provided the research design and methodology for the study of secondary data obtained by CMS. The correlational design of the study guides the analysis of ACO alternative payment model's financial incentive size by testing for a correlation between the predictor and the three outcome variables (acute care readmissions, per capita expenditures and outpatient ED visits) of concentrated segment of the population of interest at a single point in time. The three multivariate regression test findings will determine if financial incentives size predicts acute care readmission rates, per capita expenses of the ACO participating beneficiaries and/or outpatient ED visits. Control variables were introduced in regression tests, consisting of several potential outliers; those aged 85 years old and older, Hispanic and African Americans, ACO size, males, disabled beneficiaries and hospital affiliation. This study targeted a vulnerable population with significant health challenges. The 65 and older age group represents a substantial portion of consumers accessing health service. Nearly 60 million of these individuals receive health care through a federal regulated MSSP program, such as the one tested in this study (Social Security Administration, 2016).

This study design determined correlations made between the IV and the DVs, through the use of quantitative statistical data analysis of archival data, designed and collected by the CMS. The study was designed to test the monetary influence or strength

of APM financial incentives that intend to promote quality care in an ACO defined setting. The predictive relationship of the incentive size is perceived to be the predictor of ACO performance according to this dissertation. The VBPIT framework presents a streamlined data analysis process to test the hypotheses without violating the study's integrity, ethics or compromising participate data, thus validating the study's findings with statistical support. Descriptive statistics using mean, standard deviation, and frequency were compiled and reported, as well. Chapter Four provides a complete report of the results found in this chapter. The report also includes descriptive statistics and statistical assumptions where appropriate. Accompanying tables and figures illustrating data results were included in Chapter 4.

Chapter 4: ACO Performance Results

Introduction

The purpose of this study was to examine the predictive relationship between financial incentive sizes used in the ACO MSSP and their alignment with ACO performance linked to provider decision-making behavior. I developed the research questions to determine whether such a relationship exists between the financial incentive size and the three dependent variables: ACO readmission rates, ED visits not resulting in a hospital admission, and per capita expenses of the Medicare subpopulation participating in the shared savings program. The MSSP uses a defined metric standard of incentive amounts and quality specified measures applied to the ACO's reimbursement methodology (CMS, 2017a). I also used the quality performance predictors linked to 33 quality benchmark metrics identified by CMS (2017a) in this study. My use of the VBPIT as the theoretical framework supported the SPSS statistical data outputs presented within the scope of behavioral economics. Theoretically, molding contractual arrangement contributions in an effort to balance provider motivation and medical decision-making optimizes performance and quality delivered care (Conrad, 2015). Political and regulatory implications support a more efficient, higher quality, and responsive health care delivery system, further supporting the application of universal quality standards by using defaults in the delivery of clinically-coordinated care.

I developed the following research questions and hypotheses to support the purpose of this study:

Research Question 1: How does the MSSP value-based incentive size relate to the ACOs' performance on acute care readmission rates?

$H_0$1*:* There is no statistical relationship between the incentive size of the MSSP and acute care readmission rates in an ACO setting.

$H_1$1: There is a statistical relationship between the incentive size of the MSSP and acute care readmission rates in an ACO setting.

Research Question 2: How does the MSSP value-based incentive size relate to the ACOs' performance on the frequency of ED visits that do not result in a hospital admission?

$H_0$2*:* There is no statistical relationship between the incentive size of the MSSP and ED visits in an ACO setting.

$H_1$2*:* There is a statistical relationship between the incentive size of the MSSP and ED visits in an ACO setting.

Research Question 3: What is the association between the MSSP value-based incentive size and the total performance year spending per ACO Medicare beneficiaries?

$H_0$3: There is no statistical relationship between the incentive size of the MSSP and per capita expenditures in an ACO setting.

$H_1$3: There is a statistical relationship between the incentive size of the MSSP and per capita expenditures in an ACO setting.

In Chapter 4, I will present the statistical findings of this study. Sampling characteristics of the MSSP database include the Medicare subpopulation as defined by

CMS (2016). I used publicly available secondary data to test for relationships between the variables. Scatter plots using CMS MSSP PUF specific database variables were used to evaluate the statistical assumptions of linearity and homoscedasticity for each dependent variable in this study; therefore, I will present results for the three multiple regression tests. The statistical analyses that will be presented in this chapter include a narrative and visual presentation of the assumptions of multiple linear regression, Box-Cox transformation statistic, descriptive statistics, model alignment, and t-test significance. I used SPSS to perform the analyses and the statistical outputs of the three multiple regression tests. The actual steps in data collection did not vary from the steps that I outlined in Chapter 3.

Results

Descriptive Analyses

Descriptive statistics should be provided for all variables in the study, providing an analysis of the measures of the variability and central tendency of the variables (Field, 2013). Table 2 shows the descriptive statistics for the independent variable (incentive size), the three dependent variables (acute care readmissions, outpatient ED visits, and per capita expenditures of aged beneficiaries), and eight additional covariates that are controlled for in the study.

Table 2

Sample Characteristics: Variable Specific Descriptive Statistics

Study variables	Minimum	Maximum	*M*	*SD*
Dependent variables				
Number of acute care readmissions (all-cause 30 days)	93	268	169.07	25.46
Number of outpatient ED visits	316	1461	728.24	167.26
Per capita expenditures of aged beneficiaries ($)	3,499	23,950	9,560	2,084
Independent variable				
Incentive size ($)	3,782,336	1,704,960,610	198,919,076	192,394,993
Covariates				
ACO size (Gp 1 = 1 – 8,500; Gp 2 = 8,501 – 22,500; Gp 3 = 22,501 +)	513	149,633	19854.55	19224.173
Number of disabled beneficiaries	45	21966	2,645.31	2591.96
Number of assigned beneficiaries aged 85+	44	19734	2,489.58	2519.13
Number of assigned male beneficiaries	295	62716	8,489.05	8236.57
Number of assigned African American beneficiaries	3	18048	1,677.00	2145.4
Number of assigned Hispanic beneficiaries	1	3078	285.65	443.62
Number of critical access hospitals	0	52	0.83	3.65
Number of electing teaching amendment hospitals	0	8	0.03	0.43

Note. $N = 348$.

Assumptions

Prior to running multiple regression tests, I investigated five assumptions against the set of variables listed in Table 1. The assumptions of normality, linearity, homoscedasticity, multicollinearity, and a review of the multivariate outliers were assessed for each DV used in the multiple regression tests performed. Variables include three DVs, one IV, and eight covariates.

I used scatter plots to test the linearity of the sampling distribution of the DV while controlling for the confounding variables included in the regressions. Scatter plots also allowed for the visual identification of outliers. Additionally, Cook's distance or Cook's D was completed for a statistical confirmation of bivariate outliers for each DV. By examining the standardized and predicted residual values, homoscedasticity was assessed (see Williams, 2015). In this study, I tested the assumption of homoscedasticity using scatter plots showing visually skewed data and then with White's test posttransformation. The assumption of multicollinearity was tested by producing a collinearity diagnostic for the variance inflation factor (VIF) of each variable. These values identify the relative strength between two or more predictor/explanatory variables (see Field, 2018). The number of beneficiaries that are disabled, aged 85 years or older, males, African American, and Hispanic were transformed to percentages, and these values were each divided by the ACO size and then multiplied by 100. Normality was also assumed and the Shapiro-Wilk test of normality, a multiple regression test, was run in SPSS (see Field, 2018). To assess normality, I inspected the datasets were visually (manually) for normal distribution and statistically presented values. The independence

of errors assumption was tested by running a Durbin-Watson calculation, which can detect serial correlations between residuals (see Field, 2013). The Durbin-Watson statistic-value informs the researcher if the assumption of independence has been violated (Field, 2015). Nonviolations of these assumptions further contribute to the confidence and generalizability of the findings. Prior to data analysis, the minimum sample size was calculated by applying alpha to a medium effect size at 80% power using SPSS. I then used a Bonferroni's corrected alpha (.017), which resulted in a calculated sample size of 136 ACOs.

Research Question 1: Incentive Size and Acute Care Readmissions

I determined the assumption of independence by the Durbin-Watson value calculated for Research Question1, yielding a 1.899 value. This value indicated that there was no violation of independence of the acute care readmission variable dataset. The scatter plot of the explanatory variable of Research Question 1 is presented in Figure 1 because heteroscedasticity and nonlinear in its presentation of the acute readmissions rate dataset correlated with its unstandardized predicted values. To further evaluate the assumption of homoscedasticity in this dataset, I performed White's test yielding additional support to reject the null hypothesis of homoscedasticity as $p = .004$. There is a 0.45% chance of rejecting a true null hypothesis of homoscedasticity. Thus, the assumption has been violated and the alternative hypothesis of heteroscedasticity was not rejected. Based on scatter plots that were run with initial data, the assumption of linearity was additionally violated. In response to violations of linearity and homoscedasticity, I performed the Box-Cox transformation on the variable as described in Chapter 3.

Multicollinearity and VIF

Multicollinearity occurs when an explanatory or independent variable is strongly related to a linear combination of the other independent variables and can increase the variance of the regression coefficients (Forthofer et al., 2007). VIF of the explanatory variables are more effective when determining relations between independent variables due to the detection of more subtle forms of multicollinearity (Forthofer et al., 2007). The VIF of an explanatory variable indicates the strength of the linear relationship between the variable and the remaining explanatory variables (Forthofer et al., 2007). VIFs less than 10 are generally accepted (Forthofer et al., 2007).

The assumption of multicollinearity was tested using the collinearity diagnostic output from SPSS, VIF. Statistical output indicated a high level of multicollinearity was present for the ACO size (VIF = 874.87), incentive size (VIF = 53.21), aged 85 and older (VIF = 33.96) and males (VIF = 803.93). The remaining five covariate VIF values were below 10. These VIF values are duplicated for all dependent variables in their original form, thus this assumption is violated for all research questions. Box-Cox transformation will additionally correct for this assumption violation.

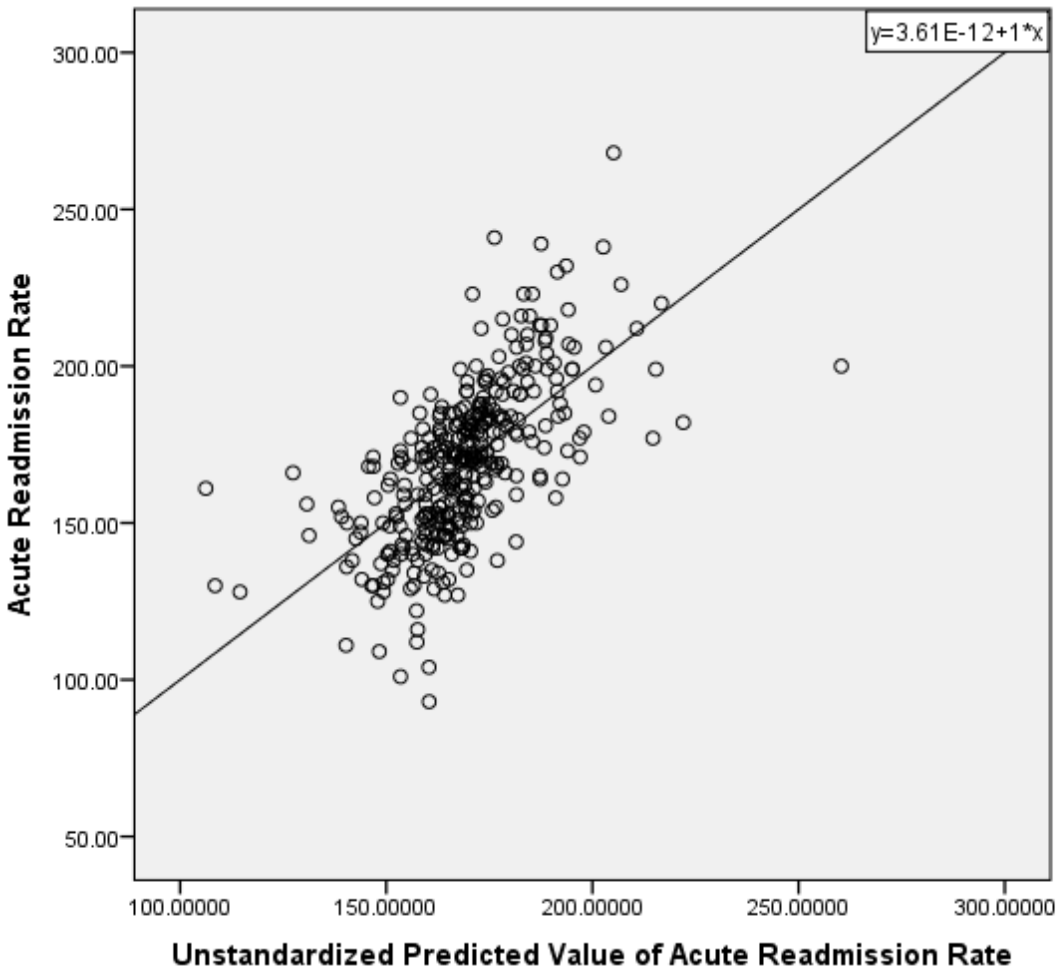


Figure 1. Acute care readmissions correlation (unstandardized predicted value).

Post Transformation

The normality and multicollinearity violations support a conversion of DV data using a Box-Cox transformation and changes to some covariate scales. Statistic transformation was completed in XLSTAT Excel. Several plug-ins were attempted to rectify SPSS issues in producing the Box-Cox transformation, thus an alternative software program was needed to generate conversion. The generated transformed data was then copied to SPSS as a new variable. To test the assumption of normality, the

Shapiro-Wilk normality test was performed on the transformed readmission variable dataset in SPSS. The Shapiro-Wilk pretransformation and posttransformation normality test results are compared in Table 3. With the presence of heteroscedasticity identified in the initial scatter plot and then verified by the results of the White test, the residuals plotted yielded a linear relationship after transforming the acute care readmissions variable data (Figure 2).

The findings in Table 3 indicate that the distribution of data is borderline normal. However, a Box-Cox transformation was done to improve the normality of the sampled variable. In the Box-Cox transformation, a lambda value of 0.5 was applied. Table 4 shows the outcome of this transformation that produced a stronger transformed variable distribution of the acute readmissions rate.

Table 3

Test of Normality for Acute Care Readmission Pre-& Post Transformation

	Shapiro-Wilk Pre		Shapiro-Wilk Post	
	Statistic	Sig.	Statistic	Sig.
Acute Care Readmission Rates	.993	.097	.996	.613

a. Lilliefors Significance Correction

A transformation of the readmissions rate variable adjusted the data distribution of residuals, which are linearly represented in Figure 2. Outliers observed in Figure 1 prompted additional statistical evaluation, thus the correlating z-score was calculated. A total of five outliers were removed and the normality assumption was met. A scatter plot of the acute care readmission expected and observed standardized residuals after

transformation and adjustment to variable dataset, there is no linearity violation. According to Figure 1, only mild outliers are presented in this variable dataset prior to transformation. Table 3 statistically confirms the weak significance found in the scatter plot depicted in Figure 1. Outliers are also a threat to the validity of the results of a multiple linear regression. The Cook's distance (Cook's D) statistical test was applied the acute care readmission variable. Cook's D is used to determine how much influence the predictor variable (incentive size), covariate, has on the dependent variables (outpatient ED visits, acute care readmissions, per capita expenditures) or outcomes. Outliers can place undue influence on the explanatory variable.

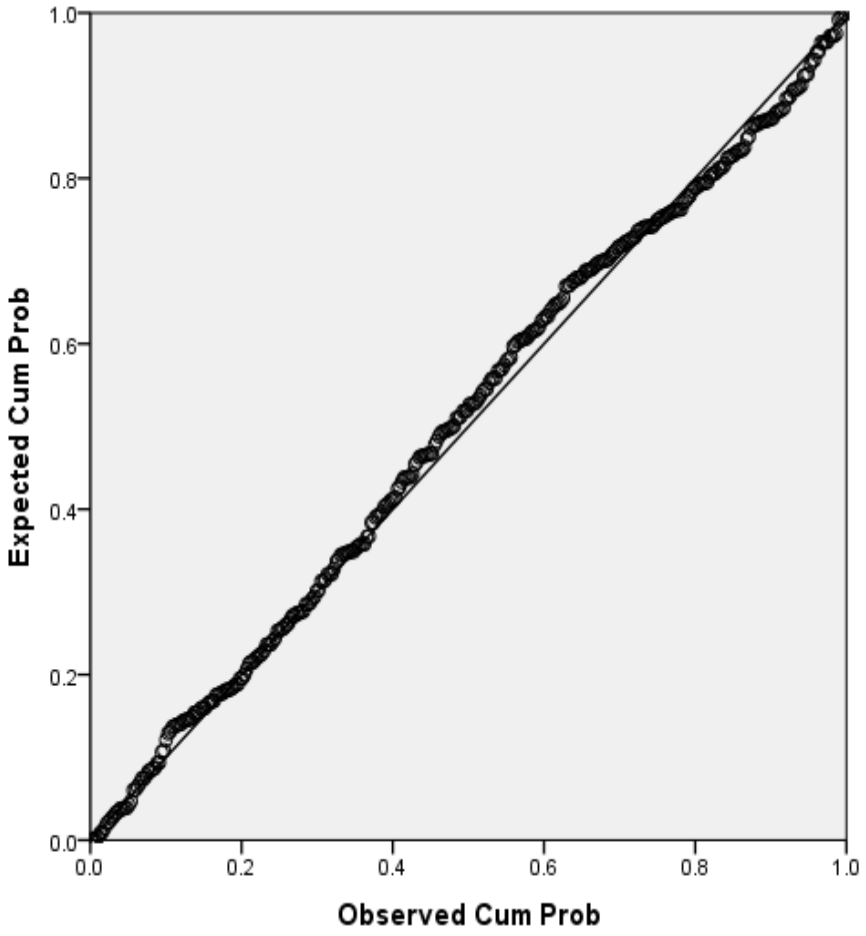
In an effort to correct not meeting the assumptions of multiple linear regression, outliers were removed from the variable data. Cook's distance was plotted with acute readmission rate visually showing a distinct outlier then based on the residual statistic output the minimum and maximum of Cook's distance was obtained (.000, 11.461); after this process the data was transformed to provide compliance of assumptions of the readmissions rate (i.e., DV). The conversion of the number of participants who were disabled, ages 85+, male, African American, and Hispanic to percentages addressed multicollinearity. Each variable identified as a number/rate was divided by ACO size and multiplied by 100 to determine the percentage. Another variable of concern is ACO size because of an extreme VIF value pre-transformation. To reduce multicollinearity, ACO size was broken into 3 groups, converting the scale from nominal to ordinal:

- Group value 1 = 0 – 8500 MSSP ACO participating beneficiaries
- Group value 2 = 8501 – 22500 MSSP ACO participating beneficiaries

- Group value 3 = 22501 + MSSP ACO participating beneficiaries

Through grouping of the ACO dataset, VIFs were recalculated after the conversion of the disabled, Hispanic, African American, ages 85+, and males from absolute numbers to percentages. The post transformation output of the collinearity diagnostics indicate that VIF values were less than 10 for all variables, these values ranged from 1.068 (critical access hospitals) to 1.973 (ACO size groups). The assumption of multicollinearity was met for acute readmission rates, ED visits, and per capita expenditures dependent variables with control variables tested.

After applying the Box-Cox transformation to the acute care readmissions rate dataset, heteroscedasticity remains present. As per the design and scope of the study, the homoscedasticity assumption is violated and is considered a limitation of the study.



Note. Readmissions rate: DV

Figure 2. Transformed; P-P plot of regression standardized residual.

The assumption of linearity was met according to Figure 2 and Table 3 with the transformed data applied. The scatter plot shows a stronger linear relationship. Figure 2 shows a fit line showing the measures of dispersion distribution of the transformed data, acute care readmission variable, meeting the linearity assumption for Research Question 1. The conversion of covariate datasets indicate that after transformation the multicollinearity assumption is met. A final change was made to the incentive size proxy

ABtotBnchmk data variable, dividing values by 1 million to convert data aligning beta with confidence intervals.

Multiple Linear Regression

The model summary and ANOVA results generated for Research Question 1 (readmission rates) with controls are $R^2 = .369$, F (9, 336) = 21.848, $p < .000$; 36.9% of the variance can be explained by the predictors. Unstandardized beta values, standard error, and their respective significance level are indicated in Table 3. The data shows that incentive size ($p = .010$), the disabled ($p < .000$), critical access hospitals ($p = .022$), ages 85 + ($p < .000$), African American ($p < .000$) and Hispanic ($p < .000$) and the disabled ($p < .000$) significantly contribute to predicting readmission rates. Corresponding beta values were positive for the above-mentioned significant variables. There was no influence found from males, ACO size groups, or ETA hos*p*itals on acute care readmission rates. The null hypothesis is rejected in Research Question 1.

Table 4

Incentive Prediction of Acute Readmissions with Controls

Acute Care Readmissions	Correlation Coefficients			
	SE	Unstandardized β	95% CI	*p*
Incentive size (dollar amt)	.000294	.001	[.000185, .001342]	.010
ACO size groups	.082	-.061	[-.222, .100]	.458
Percentage of Disabled	.007	.041	[.027, .055]	< .000
Percentage of beneficiaries aged 85+	.015	.123	[.094, .151]	< .000
Percentage of Males	.022	.034	[-.010, .079]	.126
Percentage of African Americans	.005	.027	[.017, .036]	< .000
Percentage of Hispanics	.014	.053	[.026, .081]	< .000
Critical access hospitals	.012	-.027	[-.050, -.004]	.022
Electing teaching amendment hospitals	.099	.042	[-.152, .236]	.067

Note. $N = 343$.

a. Predictor: (Constant), incentive size

b. DV: transformed and rescaled acute readmissions rates per 1000

c. Covariates: aged 85+, ACO size groups, males, Hispanic and African American races, CAHs, ETA hospitals, disabled

Research Question 2: Incentive Size and Emergency Department

The assumption of linearity, homoscedasticity, and outliers are examined visually through the scatter plot in Figure 3. Figure 3 gives a visual presentation of the dataset and suggests a non-linear relationship, additionally showing the presence of outliers and heteroscedasticity. Each assumption was further tested using a variety of appropriate statistical tests as listed in Research Question 1, results are as follows. Quantifying these

assumptions through statistical tests provide validation of the model fit. The Shapiro-Wilk normality test yielded the results outlined in Table 5. These findings indicate nonnormality of the dataset. As seen in Figure 3, the assumption of homoscedasticity is concluded by performing White's test. Findings revealed that $p = .005$, thus rejecting homoscedasticity and accepting the alternative hypothesis of heteroscedasticity for this dependent variable, the risk of a type I error is less than 0.51%. Box-Cox transformation will correct for violation of linearity and normality.

Multicollinearity of the 3 dependent variables was examined by reviewing the VIF. Tests for multicollinearity, as noted prior, indicate high levels of collinearity is present for the ACO size (VIF = 874.87), incentive size (VIF = 53.21), those 85 and older (VIF = 33.956) and males (VIF = 803.929), the remaining five covariate VIF values were below 10, $R^2 = .470$, $p < .000$, F (9,347) = 33.24. Outliers were examined visually and statistically equated via SPSS. Cook's D test was used to locate potential outliers. Cook's D gave the value of 13.932, suggesting a violation of the outlier assumption when testing the original dataset. Outliers are removed posttransformation.

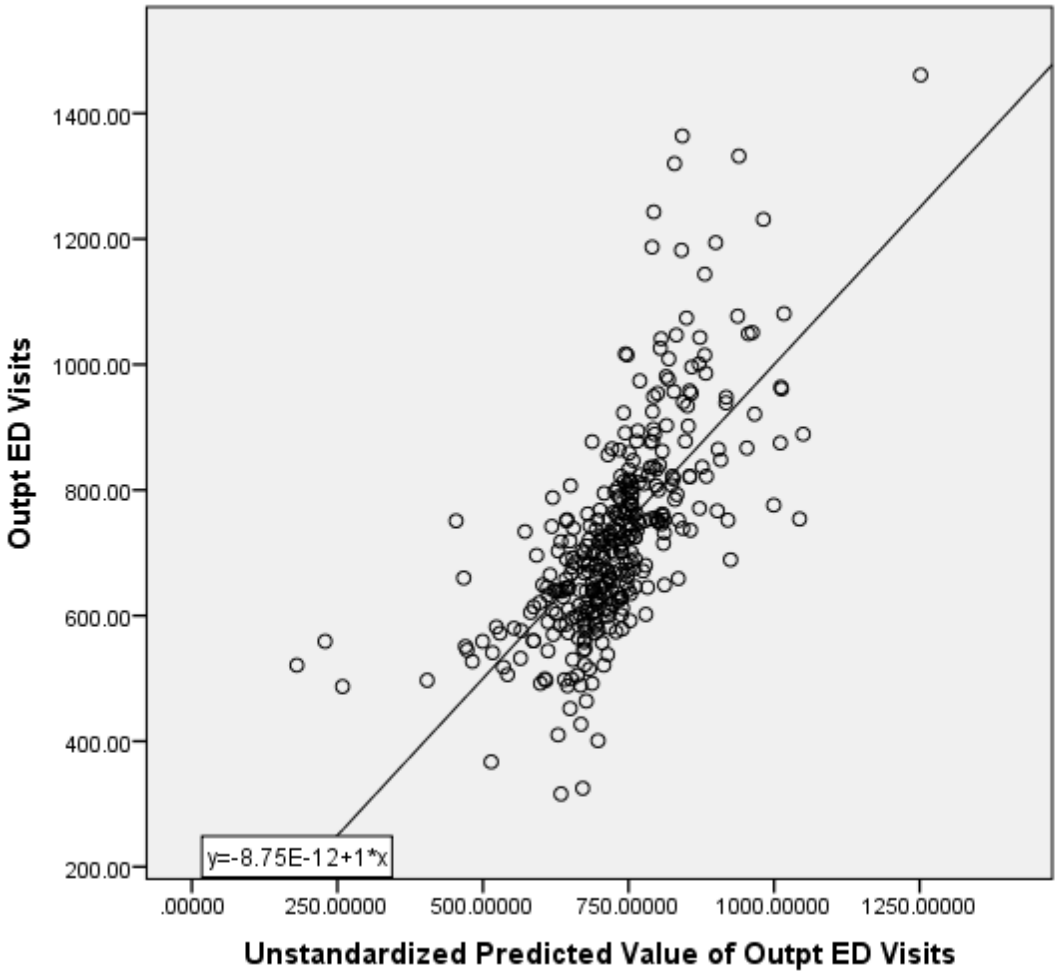


Figure 3. ED visit multivariate correlation with unstandardized predicted values.

Prior to transformation, the Durbin-Watson value was calculated for Research Question 2 at 1.994 for the multiple regression tests, indicating a solid fit of the model with no violation of independence. The test for normality of the data for outpatient ED visits are detailed in Table 5 prior to transformation, indicating a violation of normality. Findings are also provided in Figure 3, output support the need for data transformation given the significance level, both normality and linearity assumptions were not met provoking an application of the Box-Cox transformation. Based on the expansive

violations of the assumptions, the dataset for ED visits were transformed using a Box-Cox calculation in SPSS. Figure 4 provides a histogram of the transformed dataset. A lambda of -0.16 was used in the Box-Cox calculation transformation. The converted dataset for the variable showed a successful conversion as seen in Table 8 and Figure 4.

Table 5

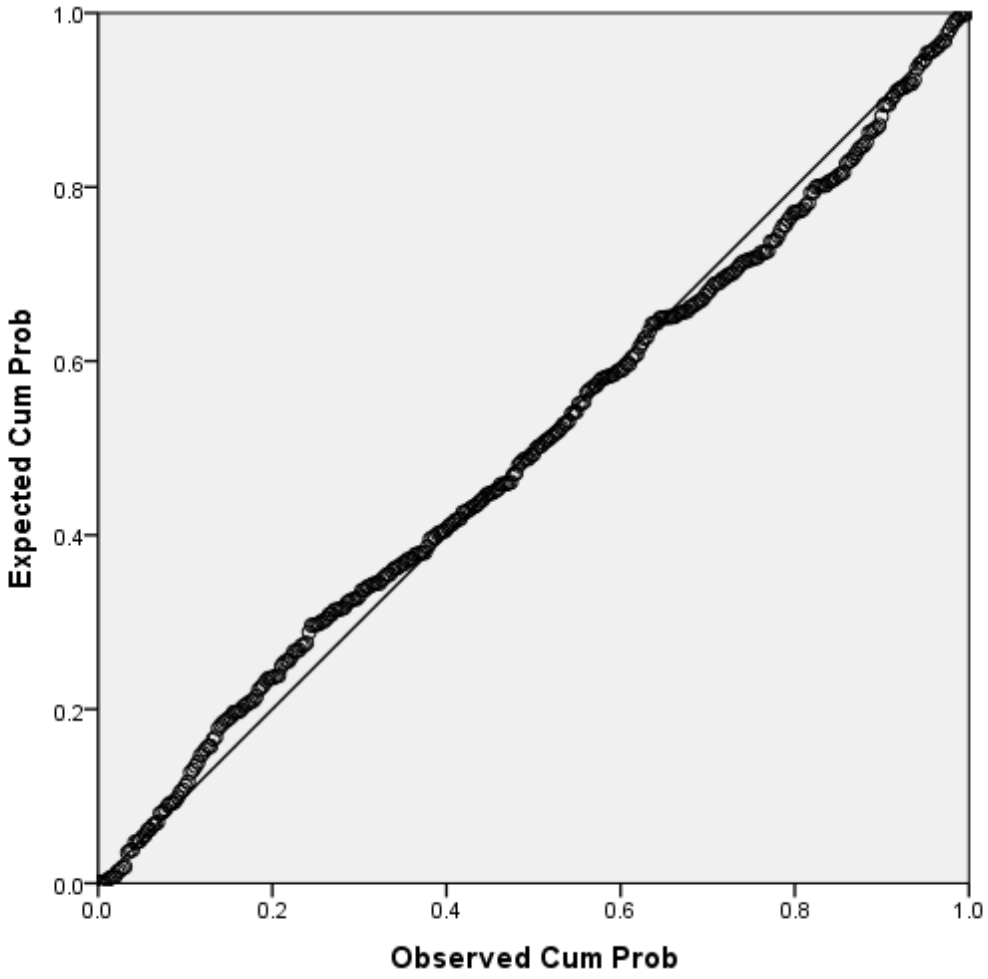
Test of Normality for Outpatient ED Visits Pre-& Post Transformation

	Shapiro-Wilk Pre		Shapiro-Wilk Post	
	Statistic	Sig.	Statistic	Sig.
ED Visits	.944	< .000	.994	.184

a. Lilliefors Significance Correction

Posttransformation

Upon transformation of the ED visit variable, the sample distribution is linear in Figure 4; therefore the linearity assumption is not violated. A normality test for RQ2 provided a level of significance in the distribution of the data after the transformation seen in Table 4. Results of these tests indicate that the normality assumption has been met posttransformation.



Note. ED visits: DV
Figure 4. Transformed without outliers; P-P plot of regression standardized residual.

Table 5 shows that the normality assumption is met post transformation. Cook's D minimum and maximum are .000 and 51.419 respectively. Z-scores were then calculated in SPSS and four outliers with z-scores of +/-3.29 were removed in response to the Cook's D value. The VIF values, are as noted, in the post transformation section for acute care readmissions; multiple changes to the variables occurred, including converting rates to percentages and clustering ACO size data into small, medium and large groups as

previously discussed. After the changes to this dataset, a VIF was rerun and showed no collinearity of the variables; hence the assumption of multicollinearity was met. After applying the Box-Cox transformation to the outpatient ED visit dataset, heteroscedasticity remains present. As per the design and scope of the study, the violation of the homoscedastic assumption is violated and considered a limitation of the study.

Multiple Linear Regression

Incentive predictions of the rate of outpatient ED visits as hypothesized in Research Question 2 yielded $R^2 = .593$, $F\ (9, 335) = 54.264$, $p < .000$ in linear regression testing. Table 10 shows the predictor variables that tested significant, these include those aged 85+ ($p < .000$), the disabled ($p < .000$), and African Americans ($p = .001$) participating in the MSSP. The negative beta values indicate an inverse relationship between the statistically significant predictors and outcome variables; as the percentage of those aged 85+ and the disabled increase in ACO's, outpatient ED visits decrease by the listed beta coefficient value. Table 6 provides a comparison of the beta values and their significance. The null hypothesis was accepted.

Table 6

Incentive Prediction of ED Visits with Controls

ED Visits	Correlation Coefficients			
	Unstandardized			
	SE	β	95% CI	*p*
Incentive size (dollar amt)	.000003	$-5.06E^{-6}$	[-.000011, $7.04E^{-7}$]	.085
ACO size groups	.001	.001	[-.000176, .003]	.081
Percentage of Disabled	.000073	-.001	[-.001, -.001]	< .000
Percentage of beneficiaries aged 85+	.000151	-.001	[-.001, -.001]	< .000
Percentage of Males	.000225	$-7.88E^{-5}$	[-.001, .000364]	.726
Percentage of African Americans	.000047	-.000161	[-.000254, -.000069]	.001
Percentage of Hispanics	.000134	$2.93E^{-5}$	[-.000235, .000293]	.827
Critical access hospitals	.000116	-.000193	[-.000421, .000035]	.097
Electing teaching amendment hospitals	.001	.000227	[-.002, .002]	.817

Note. $N = 344$.

a. Predictor: (constant), incentive size

b. DV: transformed and rescaled ED visits

c. Covariates: aged 85+, ACO size groups, males, Hispanic and African American races, CAHs, ETA hospitals, disabled

Research Question 3: Incentive Size and Per Capita Expenditures

A Durbin-Watson value of 1.816 was identified for the multiple linear regression test indicating there is no violation of independence in the correlation of per capita expenditures and predictor variables. The linearity assumption is not met based on the results seen in Figure 5. The per capita variable presents as non-normal in the Shapiro-Wilk normality test, significance is calculated as .000 (> 0.05) when testing the original dataset. The normality assumption is not met. In Figure 5, heteroscedasticity is present,

validated by the White test results, *p*= .004 with less than a .45% of type I error occurring. The assumption is not met; heteroscedasticity is present.

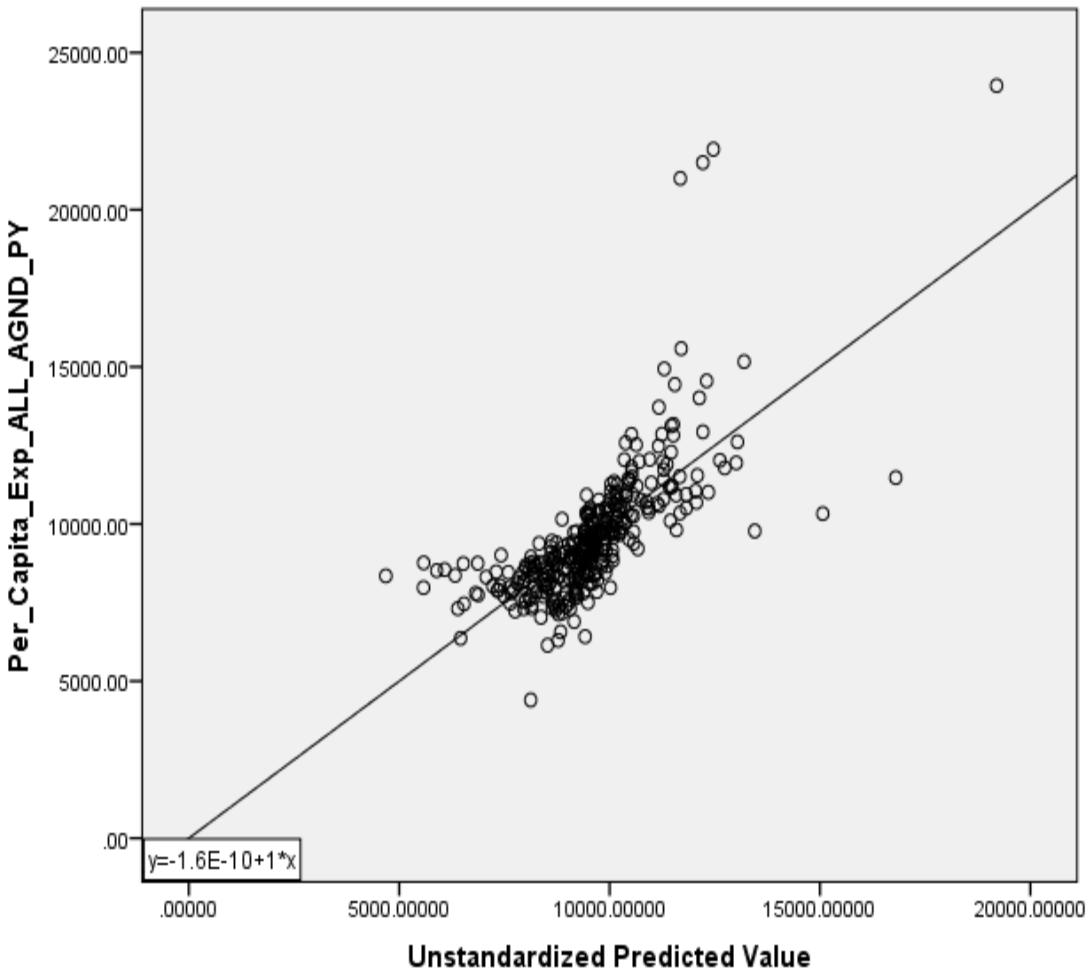


Figure 5. Per capita expenditure correlation with incentive size.

Lastly, the test of multicollinearity is examined using the VIF diagnostics. These are identical to the previous two DVs, output identifies high levels of multicollinearity was present for the ACO size (VIF = 874.87), incentive size (VIF = 53.21), those 85 and older (VIF = 33.956) and males (VIF = 803.929), the remaining five covariate VIF values

were below 10. Overall, there is a need to align these variables to meet the assumptions of the multiple linear regression tests.

PostTransformation

A Box-Cox transformation was performed and produced different measures of significance per normality test. The Shapiro-Wilk's normality test (post transformation) yielded a significant outcome for the variable's normality. The normality assumption is considered significant if it is larger than .05 (Table 7). A lambda of -0.5 was applied to the data transformation shifting the data values.

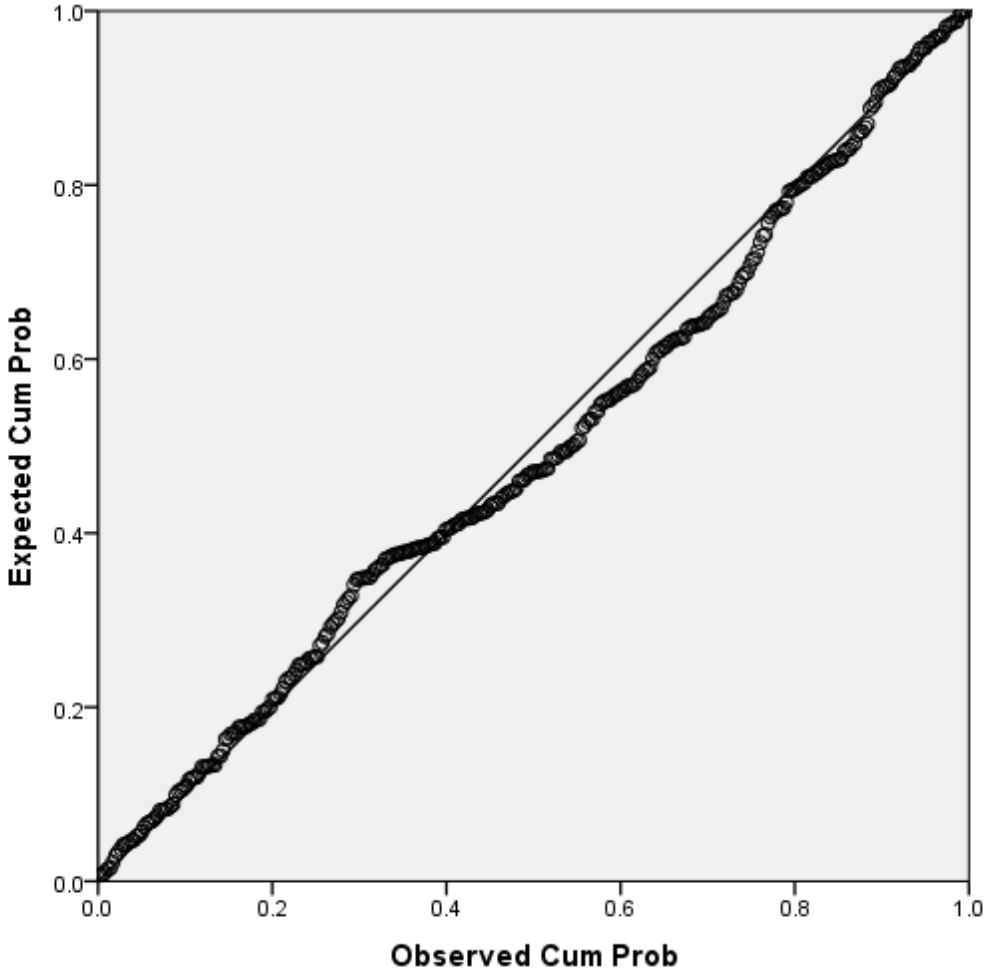
Table 7

Test of Normality for Per Capita Expenditures – Pre and Post Transformation

	Shapiro-Wilk Pre		Shapiro-Wilk Post	
	Statistic	Sig.	Statistic	Sig.
Per capita	.792	.000	.995	.357

a. Lilliefors Significance Correction

The variable's dispersion in Figure 6 show that the converted data yielded a normal distribution of the variables standardized residuals. As seen in Figure 6, the linearity assumption is met. Cook's D post transformation values (.000, 51.419) indicate there are undue influences by the outliers to the regression line even with the removal outlier cases (+/- 3.29) from the dataset; 5 outlier values were removed.



Note. Per capita expenditure: DV

Figure 6. Posttransformation; P-P plot of regression standardized residual.

After the conversion of this dataset, multicollinearity statistics, VIF's were rerun to show no collinearity of the variables, hence the assumption of multicollinearity is met. After applying the Box-Cox transformation to the per capita expenditure dataset, heteroscedasticity remains present. As per the design and scope of the study, the violation of the homoscedastic assumption is unavoidable and considered a limitation of the study.

Multiple Linear Regression

The final multivariate regression performed tested the per capita expenditures of aged non-dual assigned beneficiaries predicted by incentive size and the additional covariates. The results identify R^2 =.317, F (9, 333) = 16.59, p < .000. These findings indicate that incentive size, males, ages 85+, ACO size, African Americans and Hispanic races participating in the MSSP make a significant contribution when predicting per capita spending. Incentive size, male, African American and Hispanic races' beta values indicate an inverse relationship between these predictor variables and per capita expenditures of the ACO beneficiaries. Thirty-one percent of the variance in per capita expenditures can be explained by incentive sizes and the above-mentioned influential covariates.

Table 8

Incentive Prediction of Per Capita Expenditures with Controls

			Correlation Coefficients	
Per Capita Expenditures	SE	Unstandardized β	95% CI	*p*
Incentive size (dollar amt)	$2.37E^{-7}$	$-6.28E^{-7}$	[-.000001, $-1.61E^{-7}$]	.009
ACO size groups	.000067	.000140	[.000008, .000272]	.038
Percentage of Disabled	.000006	$-5.08E^{-6}$	[-.000017, .000007]	.400
Percentage of beneficiaries aged 85+	.000014	-.000144	[-.000171, -.000181]	<.000
Percentage of Males	.000019	$-5.42E^{-5}$	[-.000091, -.000017]	.004
Percentage of African Americans	.000004	$-1.83E^{-5}$	[-.000027, -.000010]	<.000
Percentage of Hispanics	.000012	$-3.28E^{-6}$	[-.000056, -.000010]	.006
Critical access hospitals	.000009	$1.08E^{-5}$	[-.000008, .000029]	.248
Electing teaching amendment hospitals	.001	$-7.46E^{-5}$	[-.001, .001]	.904

Note $N = 343$.

a. Predictor: (constant), incentive size
b. DV: transformed and rescaled per capita expenditures
c. Covariates: aged 85+, ACO size groups, males, Hispanic and African American races, CAHs, ETA hospitals, disabled

Four of nine covariates in the regression analysis of Research Question 3 coefficients were significant with inverse relationships. Inverse predictors include incentive size, males, African Americans and Hispanic races, these predictors have negative relationships with the outcome variable and per capita expenditures. The negative beta-values indicate an inverse relationship between the statistically significant

predictor and outcome variables. As incentive size and the percentage of males, African Americans, and Hispanics increase in ACOs, the expenditures per capita decrease by the listed beta coefficient value in Table 7. The null hypothesis was rejected.

Summary

This chapter provides results of the statistical analyses of predictability of incentive size on ACO performance of Medicare beneficiaries participating in the MSSP. Findings include a significant predictive relationship for two of the three dependent variables tested after transformation of the three DV datasets. The null hypothesis was rejected for Research Questions 1 and 3 after datasets were transformed, scale adjustments and outliers were removed to meet assumptions.

Results of multiple regression tests indicate that there is a relationship between incentive size and acute care readmission rates, as well as per capita expenditures for non-dual aged beneficiaries, when controlling for ACO size, the disabled, males, those aged 85+, African Americans and Hispanics, use of Method II critical access hospitals and electing teaching amendment hospitals participating with MSSP under an ACO.

In testing Research Question 1, results show that incentive size, F (9, 336) = 21.848, $\beta = .001$, $p = .010$ and six covariates, the disabled $\beta = .041$, $p < .000$, African American $\beta = .027$, $p < .000$ and Hispanic $\beta = .053$, $p < .000$ races, critical access hospital $\beta = -.027$, $p = .022$ and aged 85+ $\beta = .123$, $p < .000$ were significant predictors of acute readmission rates. Analysis of Research Question 2 showed that incentive size F (9, 336) = 54.264, $\beta = -5.057E^{-6}$, $p = .085$ failed to predict outpatient ED visit frequency, findings were not statistically significant. The statistical analyses for Research Question 3

shows that in addition to incentive size F (9, 336) = 16.590, β = -6.275E^{-7}, p = .009 five covariates ACO size groups β = .000140, p= .038, aged 85+ β = - .000144, p < .000), African American β = -1.825E^{-5}, p < .000, Hispanic β = -3.28E10^{-5}, p = .006, and males β = -5.417E^{-5}, p = .004 are significant contributors in predicting per capita spending.

In chapter 5, I will present an in-depth discussion and analysis of the results presented in this chapter. Within the context and scope of the study's supporting literature, the results will be presented in alignment with the research questions posed. Political and regulatory implications, as well as recommendations will be presented with future suggested areas of study based on the results of this study.

Chapter 5: Discussion and Interpretation of Results

Introduction

The purpose of this study was to analyze the predictive relationship between the incentive size of the MSSP and acute care readmissions rates, ED visits, and per capita expenditures. I used secondary data in this study, and the eight covariates represented disease severity contributing to clinical vulnerability, socioeconomic characteristics linked to health disparities, and hospital affiliation in the MSSP PUF. The results of this study indicated that incentive size positively predicts acute readmission rates and negatively predicts per capita spending measuring performance in participating MSSP ACOs slightly. Provider performance and incentives are difficult to align, placing quality at risk. Financial incentives can affect health outcomes, spending patterns, access to appropriate care, treatment- and service behavior-based options, medication selection, readmission rates, and per capita expenditures.

A complex network of ACO alignments are needed to fully evolve the nation's health care delivery system. The scope of this study was focused on the MSSP ACO team-based approach to concentric performance when influenced by financial incentive size while controlling for confounding variables. The emerging themes generated from the existing literature combined ACO performance and incentive size through incentive design and operational infrastructure. The findings from this study show correlations between the predictor and outcome variables when controlling for variables representing disease severity, ACO size, and hospital affiliation specific to one of the three study hypotheses.

Interpretation of Findings

The results presented in Chapter 4 provided statistical support of data interpretation when controlling for the confounding variables of the study. The predictability of incentive size was the IV in the multiple linear regression analysis. Outcomes of the multiple linear regression analysis showed incentive size being a significant predictor of increased readmission rates and smaller per capita expenditures with no predictability of incentive size on ED outpatient visit rates.

Acute Care Readmissions

I found a significant association between ACO MSSP value-based incentive size and acute care readmission rates in this study. ACO performance was measured in part by acute care readmission rates, and the findings indicated a single unit increase of the financial incentive size, increased acute readmission rates by 7.637 ($\beta = 7.637$). Existing financial incentives induce poor performance by increasing the frequency of acute care readmissions, resulting in expensive inpatient hospital visits and expenditures

The findings for Research Question 1 contradicted the results of other studies in the literature studying financial incentive-driven savings generating a reduction in readmissions (McWilliams et al., 2013; Scott et al, 2016). Most variables studied in the literature reviewed by Scott et al. (2016) differed such as reimbursement methodology, APM program type, and incentive size. It can be implied that a robust incentive size fails to motivate providers to modify their treatment behavior, showing a need to improve the coordination of care for MSSP beneficiaries in the ACO setting. Colla et al.'s (2016) defined *clinically vulnerability* as patients with multiple chronic conditions, while the

NIH perceived them as aged (65 years old and older) and disabled (IOM, 1996). The uncoordinated care of clinically vulnerable patients raises readmission rates among 20% of the Medicare population (Colla et al., 2016). The ACO setting relies on an alignment of coordinated care among multiple specialties and providers, collaborating to provide effective and responsive care. Within the MSSP model, incentives are provided as motivation to accomplish this. Colla et al.'s findings support the recommendation of the use of standard clinical processes targeting the chronically ill and the expenses this subpopulation generates through avoidable readmissions. The reviewed literature is consistent and aligns with the findings that this subpopulation consumes more costs and resources in delivering care to the MSSP population. Reduced readmission rates suggest an improved ACO performance. These results suggested that targeted services should be developed and provided to these populations to further reduce and avoid future readmissions.

Colla et al. (2017) studied the Pioneer and Shared Saving ACO programs, tracking total spending per quarter in their study. My findings in this study shared three overlapping variables with the study conducted by Colla et al. These variables were 30-day readmission rate, ED visits, and per capita spending in absolute dollars. The findings of Colla et at. (2017) aligned with my Research Question 3 results. Overall per capita spending decreased with ACO contractual obligation, showing approximately three times the savings in the clinically vulnerable or those with higher disease severity (Colla et al., 2017). The findings for Research Question 2 also aligned because incentives contractually outlined in ACOs did not decrease ED visits significantly in Colla et al.'s

results and ED visit frequency decreased by 1.3 events for all Medicare beneficiaries. Colla et al. found an increase in acute care readmission rates (i.e., Research Question 1) in studied ACOs but failed to consider ACO size or hospital affiliation which I included in my study. Colla et al. noted these factors may in part subscribe to ACO success, and in both studies, universal quality processes of team disease management were identified as contributors to future ACO success.

Collectively, the literature is dependent on the strength of the contractually defined MSSP incentive size and statistically supported the prediction of readmissions as a source of health care expenditures (Conrad, 2015). These components ultimately impact the MSSP and ACO performance (Conrad, 2015). By providing aligned contractual arrangements with incentive size and quality benchmarks, accountable performance improves by reducing per capita expenditures and adhering to the program requirements.

The results of this study failed to align with those of Evan and Demko (2015) and Nyweide et al. (2015) on the ACO Pioneer program. Both of these studies applied a fee-for-service payment methodology as opposed to the MSSP. These researchers found that financial incentives reduced acute care readmissions and the use of multiple health services, including the ED, unlike the present study (see Denko, 2015; Nyweide et al., 2015). However, according to McWilliams et al. (2015), a balanced value of financial incentives are needed. Based on the VBPIT, if the incentive is overly strong, it would diminish the shared savings component; however, it will support additional savings (Conrad, 2015). An existing linear relation exists with limitations on the incentives' size,

with larger incentives leveling out and presenting an adverse reaction to performance as described in the VBPIT (Conrad, 2015). The results of my study in conjunction with those of existing literature show the potential to misalign the value of the incentive, compromising quality of care impacting ACO performance and provider treatment behavior benchmarked by CMS.

Researchers have suggested that strong, competitive, larger incentive sizes will sufficiently motivate ACO provider teams to improve ACO performance by reducing acute care readmissions and increasing the savings potential of the ACO, contrary to statistical findings (Conrad & Perry, 2009; Ouayogode et al., 2017). Defining the incentive size of ACO performance rewards may inform the expansion of existing MSSP contracts to enforce consistent and concentric care at the ACO level (Conrad, 2015). However, meaningful measures of quality are linked to incentive size by the CMS, where ACO incentives must be balanced in size to effectively reduce acute care readmission, further contributing to a reduction in expenditures per beneficiary (CMS, 2017). Alignment between incentive remuneration and performance benchmarks may alter the behavior of the provider and ACO team positively.

Competitive incentive size contributed to the ACO provider team adherence to CMS-defined benchmarks in a balanced incentive payment strategy linked to ACO performance (Fisher et al., 2012). Fisher et al. (2012) also tested the early implementation of ACOs, capturing outcomes inclusive of incentive size structure most likely to influence ACO operational decisions on performance and its measurement in any ACO program (i.e., Advance Payment, Pioneer, or MSSP). The Advance Payment model

focused on the concept of loss aversion, assuming the fear of returning or losing the advance motivates the performance (Conrad, 2015). Contrary to the loss aversion component of Conrad's (2015) VBPIT, the program studied was without the ability to test this concept as it did not offer monetary penalties.

Existing literature also showed that when risk-adjustment strategies are applied, they provide a competitive operational incentive size as part of the reformed incentive. Application of risk-adjustment strategies contributed to a level of incentive neutrality, where incentive size plays a predictive role (Conrad, 2015; Larson et al., 2012; Torchiana et al., 2013; Williams et al., 2013). The MGPO quality incentive program tested 130 quality measures, considerably more than the 33 quality measures outlined by CMS on ACO APM rewards, to determine a range of variables tied to quality and safety improvements not just incentive size (Torchiana et al., 2013). These results did not have an impact on provider behavior and there was minimal incentive value (i.e., 2%) in the MGPO incentive program-linked specific benchmarks. Nyweide et al. (2015) published study findings that indicated that increased follow-up care for those admitted, but recently discharged, will contribute to lower readmission rates and reduce costs associated with readmission (Williams et al., 2013). The findings of my study revealed that the reduction in expenditures was attributed to a decrease in resource use among this population, without influence of the incentive size to reduce acute readmission rates. Colla et al. (2014) showed that streamlined clinical processes improved ACO performance, contributing to a decline in readmissions and in ED visits; both variables generated a plunge in per capita expenditures.

Emergency Department (ED) Visits

In this study, I failed to find a relationship between incentive size and outpatient ED visits for MSSP ACOs. The results of the multiple linear regression tests in this study showed no statistically significant association between incentive size and the number of ED visits. Incentive size did not contribute significantly in reducing the frequency of ED visits. However, the findings showed that a negative relationship exists between the covariates and recognizing clinical vulnerability with elevated disease severity, those aged 85 years old and older ($\beta = -.001$), and the disabled ($\beta = -.001$) with the incentive size, the predictor. As incentive size increases, these covariates decrease slightly. This finding suggests a reduced use of health care resources, ultimately contributing to lower per capita expenditures (i.e., the focus of Research Question 3) associated with care for the Medicare subpopulation.

Kaufman, Spivack, Stearns, Song, and O'Brien (2017) compared private and public ACO influence on health outcomes, resource usage, and clinical processes. The results of their study showed that ACOs lowered inpatient hospital care usage, thus reducing ED visits and ultimately health expenditures. These findings aligned with the findings of this study in regard to per capita spending, yet contradicted the ED visit DV. In previous research, inconsistent contract structure caused a lack of support on an ACOs effect of clinical processes linked to health outcomes.

Nyweide et al. (2015) found that with the reduced use of ED services, expenditures naturally declined. However, based on the results of this dissertation, existing financial incentive size will not suffice in changing provider behavior. Private

ACOs have more contractual viability with the capability to negotiate prices and apply benchmarks, encouraged by incentives, leading to slower spending growth and increased quality (Song et al., 2014). Song et al. (2014) implied that ACO contracts with strong incentives may elicit changes in provider decision-making behavior in a private ACO setting. Findings of Research Question 2 supports recent literature results that once a benchmark is in place, financial incentive infrastructure has the potential to strengthen provider participation in incentive driven savings (Colla et al., 2016; Rose et al., 2016; Song et al., 2014).

Per Capita Expenditures

This dissertation's RQ3 findings show a significant inverse ($\beta = -6.275$) predictive association between the MSSP value-based incentive size and the total performance year spending per ACO Medicare beneficiaries, defined as the per capita expenditures. As incentive size increases the per capita spending lowers by 6.275 units. The ACO's subpopulations per capita expenditures of health services were negatively predicted by incentive size, indicating that higher incentives will help to control per capita spending. Provider decision-making behavior is motivated by adequate incentive size and reduces expenditures. Coordination of care is encouraged by ACO MSSP incentive size in my study, as it relates to ACO performance and is noted in other research to be vital in responding to Medicare beneficiaries with five or more chronic conditions e.g. disease severity (Colla et al., 2015).

ACO performance of coordinated care also contributes to less costly care for this chronically ill subpopulation (O'Donnell et al., 2015; Williams et al., 2013). The results

of the research by Colla et al. (2016) are consistent with this dissertation's research results, that contracted benchmarks are applied to generate cost restraint of per capita expenditures. Equivalent research shows a decrease in spending for the MSSP beneficiaries labeled as *clinically vulnerable* with higher disease severity, savings were primarily generated by reducing ED visits and hospital admissions. Several studies report that applying ACO Medicare APM programs made substantial reductions in ED visits, lowering spending (Colla et al., 2016; Nyweide et al., 2015; McWilliams et al., 2015). This finding is not supported by the results of this dissertation.

ACOs have the ability to align incentive size and performance, resulting in controlled spending. By using contractual benchmarks, such as those applied to Medicare ACOs in Massachusetts's private and public programs, ACOs are held accountable for delivering universal quality of care working towards contained costs and reduced spending beyond year 1 of these programs (Ouayogode et al., 2017; Rose et al., 2016; Song et al., 2014). Literature states that savings for these organizations have been exhausted by Year 2 of federal programs, forcing the industry to look closer at where and how savings can be generated.

As shown in this dissertation, saving opportunities may revolve around improved incentive-driven processes of care that surround disease severity. According to Rose et al. (2016), if the existing benchmark structure is dissolved for CMS ACOs, a reformulated and more effective incentive strengthens the goals of the programs. The methodology of this payment strategy of rewarding providers with robust incentives for meeting a

revised, predetermined benchmark in the Medicare ACO programs produces significant savings.

Literature on the strength of the applied financial incentive supports both influence and non-influence to performance. Song et al. (2014) found no supportive evidence to suggest that savings could continue beyond Year 2 of implementation with no regulatory or program reform. My model could improve if a longitudinal study was performed comparing data from 2015 to 2018, new revisions of ACO models now include a Year 3 component which may support the findings for a more motivationally-balanced incentive size without compromising provider behavior. However, the research did report usable results in terms of incentive effectiveness, which is further supported by results produced in a study by Joynt Maddox et al. (2017). Federal programs have operational structures and formats that differ, including incentive size and incentive structure. The MSSP incentive structure does not apply penalties to performance, only bonuses. The benchmarks used to determine these bonuses are also under scrutiny. These benchmarks often fail to measure true provider-behavior in delivering health care as they only compare the ACOs performance to its performance of the previous year, thereby generating more incentive payouts than savings without loss aversion occurring.

Revision of similar programs will begin the transformation of concepts applying transparency in treatment behavior and accountability in delivering universal quality in a concentric format of care. Data suggested the lack of saving opportunities where incentives are larger than the savings return will produce an ineffective and failed program (Song et al., 2014). Savings may lie with balanced competitive rewards and

motivating baseline penalties in the MSSP, using a sliding incentive reward scale, with a comparable sliding penalty scale (Joynt Maddox et al., 2017).

Value based payment incentive theoretical foundation. Behavioral economics implies that provider motivation is influenced by financial incentives. A more competitive incentive size can substitute extrinsic for intrinsic provider motivation thereby improving ACO performance with balanced incentive size and quality benchmarks. It is important to provide risk-adjusted penalties for failures in meeting quality specific performance measures as per the behavioral economic component of this dissertation. These benchmarks are defined by CMS. According to the VBPIT, the use of penalties will further encourage the desired behavior more so than rewards alone, contradictory of the MSSP studied. This suggests that accountability with pre-set benchmarks. Presently the MSSP APM does not penalize ACOs and uses relative benchmarks. Relative benchmarks are bonus-based only, as per concerns of loss aversion (Conrad, 2015; Joynt Maddox, Samson, Zuckerman, DeLew, & Epstein, 2017).

Conrad (2015) additionally theorizes that behavioral changes are supported by a common or shared interest in the outcome applied through contractual arrangements per the principal-agent component of the VBPIT present in the MSSP arrangement. With robust incentive sizes, ACO performance will improve, but only with the use of contractual agreements. Shifting incentivized rewards to those with a shared interest in ACO performance leads to improved quality and ACO provider team accountability. The VBPIT supports the introduction of a moderate penalty applied to ACOs not meeting pre-determined benchmarks under the MSSP that current do not exist.

There is much debate on motivation. Layton and Ryan (2015) contradict the applied theory in this dissertation. Their findings show that incentive size did not play a part in impacting improvements of performance. The VBPIT suggests a robust and competitive incentive be applied; however, penalties will elicit a stronger response by providers given the loss-aversion concept (Conrad, 2015). This dissertation links ACO performance measures to both use of resources with the clinically vulnerable and hospital services. According to Franco (2015), existing literature provides a platform for the development of incentive aligned clinical standards, which is also supported by the VBPIT, guiding the ability to link clinical practice improvement activities providing uniformity to the processes of care.

Aligning ACO performance will be difficult to achieve as the VBPIT indicates that providers are incentivized stronger with individually induced incentives, which is operationally opposite of the ACOs concept of care (Conrad, 2015). Team incentives would additionally be supported by the behavioral economic component in the VBPIT of defined incentives, but subsequent to the allocation of incentive reinvestment into the ACO to improve quality to be determined by the ACO administration, involving the providers in this decision will ensure behavior alignment. There has been much debate on the effectiveness of penalties versus rewards in driving provider motivation and decision-making behavior. Conrad (2015) theorized that competitively sized rewards aimed toward the provider will help to produce the level of engagement desired; however, the ACO is not structured as such.

Findings of this dissertation assert that ACO provider team behaviors are motivated by a competitively sized financial incentive that must be contractually bound and linked to low or moderate risk of penalties through the use of pre-set performance benchmarks compared to relative performance measures (Conrad, 2015; Joynt Maddox et al., 2017). The behavioral economic component of the VBPIT requires these measures to have a direct connection to a provider's clinical decision-making ability. Accountable quality benchmark measures indicate quantifiable performance of the provider and is not based on measures "out of the providers" control. This theoretically suggests that providers are individually motivated by controllable health outcomes. With emerging ACO strategies, financial incentive motivation must capture all caregivers in the ACO setting, a setting where the VBPIT has not been tested in to date (Conrad, 2015). Strategies of the VBPIT aim to improve preventive care and team-based responses linked to CMS ACO incentive rewards through relative performance measures and hefty influential incentive bonuses. Incentivized bonuses will reduce the use of limited and costly resources contributing to lower overall expenditures.

Social implications. The social implications of this dissertation include policy reform of regulations surrounding incentive-based reward systems of federal health delivery programs, theoretically supported contractual changes outlined by robust incentivized rewards with penalty implicating benchmarks in place, and to impact policy needs to regulate the process of care in response to the beneficiary's health needs. These social implications culminate to provide a path to improved quality of care, more strategic access to care, and innovating cost saving strategies. Research findings in this

dissertation have important social change implications related to the country's emerging APM strategies and the political regulations that manage them. Inferences in this research are total per capita expenditures and acute care readmission rates are found to be predicted by financial incentives contributing to ACO performance.

The implications of these findings contribute to strategic development of quality assurance and cost saving measures made possible through aligned contractual arrangements, a theoretically supported component of a successful ACOs' performance (Conrad, 2015). Contractual financial incentive reform can lead to implementing a baseline incentive, with the potential to earn more by using a more competitive incentive to motivate quality-based ACO provider team performance, and by applying an alternate strategy of pre-set benchmark values to further lower readmissions rates while assisting in balancing a savings through incentive rewards.

By incentivizing MSSP care delivered, targeting the chronically ill and beneficiaries with more complex health conditions, ACO performance will improve. There is advanced promotion of social change through health care reform of ACO incentive supported operational strategies built to motivate provider behavior to improve performance. With the shift of both private and public payers to a value-based episode framed reward system of care, ACO incentive programs are evolving as information on the effectiveness of APM's use of incentives to modify and guide patient care generated from earlier implemented MSSP tracks.

The ACO has sparked a wave of supporting policy that follows core health goals of the country. Financial incentive models were introduced in the federal government and

private insurance sectors as a means to produce a consistent level of quality care to the insured. This value-based incentive model assesses performance at multiple levels and evaluates categories of that include quality of care, resource utilization, and clinical practice improvement activities (Franco, 2015). These incentive models are also expected to produce needed improvements that align performance goals with incentive size. These results can inform policymakers and insurance analysts that a motivating incentive size can enhance ACO performance by modifying provider behavior and using team coordinated care reinforced by reducing per capita spending.

Provider treatment and service patterns of care can be modified through the use of incentive size (Conrad, 2015; Conrad & Perry, 2009; Kaufman et al., 2017; Song et al., 2014). Social implications are wide spread, impacting regulations surrounding the health care delivery process of ACOs providing care to the MSSP population. Furthermore, regulatory contractual changes competitively influence provider decision-making behavior supportive of the ACO incentives size, contributing to improved operational performance of federal programs. There is statistical support to implement successful ACO performance that can be generalized to private insurance organizations by applying the value-based incentive payment model. The optimal balance of incentive value can influence provider behavior to lower per capita expense and contribute to universal quality standards, producing a more streamlined, coordinated, and efficient delivery of care at the ACO level.

The country's goal is to provide improved quality of delivered health services (AHRQ, 2015). This can be accomplished through multiple policy building reforms that

may reduce expenditures of costly treatment options that fail to align with the level of care needed. This further reduces the nonnegotiable costs of medications leading to a less expensive, but equally effective medication. Elevating care calls for provider motivation is to make more cost-effective choices. Theoretical suggestions of shared savings can exist through benchmarked financial incentives, defined through contracts and with creative health policies that promote savings while developing a method to deliver consistent and concentric care.

Interpretation summarized. Two of the three multiple regression tests performed found incentive size to significantly predict acute care readmission rates and per capita spending of MSSP ACO population signifying performance measures. Suggested by other literature, but not in this dissertation, is that frequent ED visits could also be a public health concern with exposure to at-risk subpopulations. The failure to link lower acute readmission rates through incentive size supports the need for more defined coordinated care leading to improved quality. Patients in the 85+ age bracket and the disabled have multiple chronic conditions making them more susceptible to communicable health threats with potential for epidemic spread and elevated costs. With streamlined service continuity, the concept of universal quality emerges when standard benchmarks are incentivized, strategically improving cost effectiveness and reinforcement of team continuity in patient management. Per capita expenditures will reduce with a contributing balanced incentive size; however; this alone will not induce universal quality or concentric care in ACOs.

Findings of this dissertation inform policy and regulations, suggesting that alignment can be accomplished by modifying elements of the existing MSSP contractual parameters and by applying standardized universal quality supported by behavioral economics with effective modification of team-based incentive disbursement supported by robust incentives. Some literature also indicates that the fear of loss or the aversion of it holds a stronger influence over behavior than a reward (Joynt Maddox et al., 2017). Presently, MSSP is a bonus only program, findings suggest that by including a penalty component to the MSSP performance is expected to improve. Additionally, results of this study and existing literature show that a larger incentive size does not guarantee that ACO provider team behavior will be influenced to improve performance (Layton & Ryan, 2015). Regulatory and social implications lie in the implementation of a penalty component to the program with predetermined benchmarks, hence adjusting the current benchmark form that compares year to year performance measuring shared saving ineffectively and where providers receive incentive rewards as a result.

Limitations

External validity is threatened in the selection of study participants, as each Medicare recipient enters the program at varying levels of health. This study accounts for disease severity through its selection of confounding variables; however, this is uncontrolled when the Medicare beneficiary ACO assignment occurs. CMS considers only demographic factors, not health status during this process. The number of disabled and ACO size were two emerging confounding factors in predicting incentive size. Thus, age contributed to the study limitations given the connection with increased chronic

conditions (five or more) and associated expenses. These were controlled in this study. With this knowledge, it is suggested to reduce limitations with more strategic considerations on ACO beneficiary assignment balancing risk-based expenditures. Pairing patients based on disease severity and the quantity of chronic or complex health conditions with ACOs that provide the specialty services are needed to provide the level of care defined. Controlling for disease severity in this research contributes to the validity of the results' generalizability within the sampled population.

Generalizability is weak in this study as the focus was program specific. How motivated behavior is guided by competitive bonuses or rewards is not generalizable among different incentive programs that have different incentive designs and sizes. The inconsistent nature of the incentive design structure remains a challenge to validate findings of incentive size influence on public and private ACO performance. The ACO setting is unique in its team-based concept, presenting difficulties in generalizing the findings among multiple health care settings. Socioeconomic variables were controlled in this dissertation, assuming their impact on costs as per the populations' health disparities in race, income, and gender.

Additionally, there is a lack of consistency in the delivery of care among this population. Incentivized standard processes of care may provide the ability to improve internal validity of the study. If Medicare applies a version of incentivized standard processes of care, these processes would streamline the delivery of health services in the ACO setting. However, this study was not all inclusive in providing insight in operational incentive design components that optimally manage ACOs.

Research limitations regarding internal validity refer to the need to transform multiple dataset variables and per capita variable selection. The process of transformation allows for the potential compromise of the study's internal validity. Additionally, the third tested dependent variable, per capita expenditures, presented a near perfect linear relationship with the original variable chosen to represent it in the dataset. Due to the near linear relationship found after statistical analyses, an alternative variable was selected, reducing concerns of internal validity threats. A final limitation of the study is the inability to transform heteroscedasticity to homoscedasticity. The proposal only outlined a Box-Cox transformation to convert the dataset per set parameters, therefore the assumption of homoscedasticity was not met. After all transformations and variable changes, no further limitations were encountered.

Recommendations

Statistical findings for Research Questions 1 and 3 show the predictability of incentive size on the dependent variables. This relationship existed following the suggested recommendations of benchmark alignment and reform, a contractually reformed incentive size, and a more balanced ACO beneficiary assignment process. There remains a struggle between intrinsic and extrinsic motivation of the provider with many of the performance measures used to determine the incentive reward value. Based on study results, it is recommended that a continued investigation be conducted on the CMS definition of type and value of benchmarks applied, specifically benchmarks linked to meaningful provider and team-based tasks where outcomes are controllable by provider participation in the program. Applying these recommendations can help

streamline care, which reduces rewarding mundane and expected tasks, shifting focus to more provider-controlled and team-specific performance measures attached to pre-determined benchmarks inclusively motivated by financial incentives. This strategy rewards team-based cost containment approaches in caring for this population.

Meaningful measures promote concentric care within a lockstep streamlined process of care. Findings support the need to control the rates of acute readmissions and per capita expenditures of the MSSP in addition to altering the rewarded quality benchmarks. Optimal reward size should be studied to maximize the savings, health improvements and coordination of care. The goal of the balanced incentive size relies in part on the operational design and payout structure. By designing an incentive that produces competitive rewards and a logical shared interest payout structure, a balance begins to form (Conrad, 2015).

A suggested change to better balance reward and performance would be to apply a set, predetermined performance benchmark linked to financial incentive values that associate a risk component to an existing MSSP bonus only system. This incentive could adjust for performance measures that exceed the minimum benchmark presented on a sliding reward scale using a pre-determined benchmark not previously linked to the performance of value-based incentive programs, as opposed to the current MSSP incentive size of a flat 2% with the dual track model shifting from 2% to 3.9% (see Conrad, 2015; CMS, 2017a). The use of a sliding scale incentive reward would require research on optimal reconfiguring of the current incentive's operational design which is now inconsistent among ACOs.

Further research is recommended in multiple supporting areas of ACO incentive-based performance. Outlined process of care standards and incorporation of an incentivizing mechanism could contribute to developing consistent quality care that aligns provider decision-making. However, more research is needed to determine the optimal cost effectiveness of applying clinical processes of care supported by enhanced incentive values which can collectively be applied to all ACO providers, regardless of assignee health status and complexity of conditions.

Additional research is recommended to investigate the best method of ACO beneficiary assignment that most effectively motivates providers through a competitive incentive size, whereby economic risk can be more balanced, increasing opportunities to gain incentive rewards through performance. Accountable care organizations with higher-risk and more cost consuming patients, including those aged 85+ and the disabled population with excessive chronic and complex conditions, can be more evenly distributed among participating ACOs. Balancing the assignment of more costly beneficiaries over a range of ACOs will assist in the strengthening of incentives applicable to operational equity and support incentive neutrality.

Future research recommendations include the effectiveness of contractual arrangements outlining a more alluring incentive size as suggested by existing literature and the VBPIT. Based on the findings, it is expected that processes of care can be motivated and supported by incentive mechanisms. Robust financial incentives and defined processes of care positively impact the consistency of ACO provider and team-

based performance through regulatory requirements of contractual arrangements universally improving quality.

Social Change

The social change implications of these dissertations' findings contribute to ACO performance alignment of a reformed financial incentive model of motivation, transforming and framing provider behavior in the U.S. health care delivery system. This knowledge informs policy makers of a more competitive financial incentive size strategy to improve ACO performance. Regulatory and policy changes in the size of MSSP incentives may improve health care delivery, particularly with performance changes of the ACO providers and treatment teams. Financial incentives assist in measuring, monitoring, and rewarding accountable care; however, their size and form influence providers differently, adding to the challenge in balancing the incentive and treatment behavior through measures of expected performances.

Literature suggests that an effective operational incentive size may contribute to motivating streamlined care through guided provider decision-making behavior. Findings and theories highlighted in this dissertation support the use of contractual arrangements to define incentive size. Social implications will directly relate to health policy changes surrounding incentive size, the format (percentage versus absolute dollar amount) of the reward and through theory based contractual applications of standard processes of care embedded in practice management software.

To maximize performance of ACOs and provider program engagement, in agreement with literature reviewed in this study, a shift in benchmark format is

recommended. By altering the existing incentives measure of performance, the year-by-year absolute performance benchmark to predetermined benchmarks applicable to all MSSP ACOs performance can be initiated. This allows financial incentives to further align with provider decision-making performance.

Revised ACO programs have applied several findings of research to improve performance. In 2018, MSSPs have a greater balance of risk and reward embedded in the incentive design, as a result refined benchmarks, use of standards, and program length has been revised (CMS, 2018). Structurally, the MSSP initially provided a percentage-based bonus with low risk to the providers, without penalty this program rewarded ACOs between 2% and 3.9% (CMS, 2016). The dissertation findings show that larger incentive sizes are related to ACO performance, suggesting a reevaluation of the incentive size and percentage format of the reward, advancing social change and affecting ACO success. All implications of change revolve around ensuring and elevating quality expectations of health care provided via MSSP.

Conclusion

An abundance of information can be extracted and inferred based on the statistical results of this dissertation. The presented information and data provide considerable insight on universally improved quality of care to the ACO population participating in the MSSP. With VBPIT support, findings show that provider care performance of an MSSP ACO is incentivized by a larger incentive size. While the strategic solutions to enhance quality, competitive costs, and affordability as it relates to access to care are complex, these theoretically supported mechanisms promote strategic policy and regulatory

changes which are additionally sustained by economically charged actions within an ethical scope of care. There is a need to improve the competitiveness of incentive motivating alternative payment models to streamline the delivery of care at the federal level, supporting a concentric system of care, which is the main concept of operations of an ACO.

The impact of incentivized performance is vast in cost containment which impacts a significant portion of the population. In 2015, 55 million Medicare enrollees were participating in one of three federal incentivizing program models, of which 23.5 million beneficiaries are provided care under the arrangements of ACOs. There were 7.8 million Medicare beneficiaries receiving care under the MSSP; this study represents approximately 14.21% of the Medicare enrollees (Muhlestein, 2015).

Performance benchmarks defined by CMS for ACO MSSP may not align with provider decision-making influenced motivation. The findings in this study suggest that use of a more robust incentive size with a defined absolute value in dollars, with penalties for not performing at the minimum benchmark, will produce improved ACO provider team performance. Contractual modifications can ensure robust incentive sizes, which can help to restructure clinical treatment, service and medication options, and narrow the provider decision-making to ensure consistent delivery of care.

The goal is to reduce the use of overpriced hospital resources and prevent acute care readmissions, which ultimately lower expenses. All of this is done through responsive team-based accountable decision-making. Optimal incentive size can be supported by contractual provisions, suggesting the need to control compliance through

contracts as regulation occurs at the state level, instead of federal. Incentive value is not the only component of the incentive model that contributes to ACO provider performance alignment or ACO success. Research informs the need to transform and regulate the format and structure of the incentive payment models, thus introducing incentive infrastructure changes into the public insurance sector, while contractually avoiding a political paradox and regulatory reform. These measures of change will guide team-based and provider decision-making systematically, ensuring universal quality. These strategies allocate the appropriate care with continuity of services applied through practice management software.

The findings of this dissertation respond to the inconsistent quality of delivered care and non-transparent decision making in the MSSP. Competitive incentive size contributes to the predictability of readmission rates and per capita spending of the MSSP assignees. The findings of this dissertation open the *window of opportunity* for policy specific social change in the U.S. health care delivery system. This allows for theoretically supported measures of actions to further develop quality-focused strategies through the use and knowledge of this dissertation's outcomes. Accountable care organization performance improves with enhanced incentive initiatives, thus revising operational infrastructure, alignment for stronger incentive sizes applying theoretically-based strategies and supporting regulatory contractual alignment will sustain the nation's evolving health care delivery system, specifically in the area of quality improvement.

References

Abduljawad, A. & Al-Assaf, A. (2011). Incentives for better performance in health care. *SQU Medical Journal, 11*(2), 201-206.

Arnold, D. (2016). Behavioral economics and countervailing incentives in value-based payment. *Physicians for a National Health Program.* Retrieved from http://www.pnhp.org/news/2016/june/behavioral-economics-and-countervailing-incentives-in-value-based-payment

Association of State and Territorial Health Officials. (2013). Accountable care organizations and public health. Retrieved from http://www.astho.org/Programs/Access/Primary-Care/_Materials/ACO-and public-Health-Fact-Sheet/

Bardach, N., Wang, J., De Leon, S., Shih, S., Boscardin, J., Goldman, E. & Adams, R. (2013). Effect of pay-for-performance incentives on quality of care in small practices with electronic health records: A randomized trial. *Journal of the American Medical Association, 310*(10), 1051-1059. doi:10.1001/jama.2013.277353.

Berenson, R. & Rice, T. (2016). Beyond measurement and reward: Methods of motivating quality improvement and accountability. *Health Services Research, 50*(S2), 2155- 2186. doi:10.1111/1475-6773.12413.

Berkeley Department of Agricultural & Resource Economics. (2015). *Omitted variable bias versus multicollinearity.* Retrieved from

http://are.berkeley.edu/courses/EEP118/current/handouts/OVB%20versus%20Multicollinearity_eep118_sp15.pdf

Blumenthal, D., Davis, K., & Guterman, S. (2015). Medicare at 50-Moving forward. *New England Journal of Medicine, 32,* 671-677. doi: 10.1056/NEJMhpr1414856

Burkholder, G. J. (2014). Multivariate statistics: An Introduction. Walden University. Retrieved from Blackboard Week 12 Resources.

Burns, J. (2013). Bundled payment. *Hospitals & Health Networks, 87*(4), 26- 30.

Burwell, S. (2015). Setting value-based payment goals – HHS efforts to improve U.S. health care. *New England Journal of Medicine, 372*(10), 897-899.

Casalino, L., Gillies, R., Shortell, S., Schmittdiel, J., Bodenheimer, T., Robinson, J., Rundall, T.,… Wang, M. (2003). External incentives, information technology, and organized processes to improve health care quality for patients with chronic diseases. *Journal of the American Medical Association, 289*(4), 434-441.

Centers for Medicare and Medicaid Services. (n.d.). *Affordable health care (ACA).* Retrieved from https://www.healthcare.gov/glossary/affordable-care-act/

Centers for Disease Control and Prevention. (2016). Health, United States, 2015 with special feature on racial and ethnic health disparities. Retrieved from https://www.cdc.gov/nchs/data/hus/hus15.pdf#093

Centers for Medicare and Medicaid Services. (2015a). *Medicare shared savings program accountable care organization performance Year 2015*. Retrieved from https://data.cms.gov/ACO/Medicare-Shared-Savings-Program-Accountable-Care-O/x8va-z7cu/data

Centers for Medicare and Medicaid Services. (2015b). On its 50th anniversary, more than 55 million Americans covered by Medicare. Retrieved from https://www.cms.gov/newsroom/mediareleasedatabase/press-releases/2015-press-releases-items/2015-07-28.html

Centers for Medicare and Medicaid Services. (2017a). *Accountable care organizations.* Retrieved from https://www.cms.gov/Medicare/Medicare-Fee-for-Service-Payment/ACO/

Centers for Medicare and Medicaid Services. (2017b). *Pioneer ACO model*. Retrieved from https://innovation.cms.gov/initiatives/Pioneer-ACO-Model/

Clancy, C. (2013). New hospital readmission policy links financial and quality incentives. *Journal of Nursing Care Quality, 28*(1), 1-4. doi: 10.1097/NCQ.0b013e3182725d82

Cochrane, D., & Orcutt, G. (1949). Application of least squares regression to relationships containing auto-correlated error terms. *Journal of the American Statistical Association*, *44*(245), 32-61. doi:10.1080/01621459.1949.10483290

Colla, C., & Fisher, E. (2017). Moving forward with accountable care organizations: Some answers, more questions. *Journal of the American Medical Association: Internal Medicine, 177*(4), 527-528. doi:10.1001/jamainternmed.2016.9122

Colla, C. H., Lewis, V. A., Kao, L. S., O'Malley, A. J., Chang, C. H., & Fisher, E. S. (2016). Association between Medicare accountable care organization implementation and spending among clinically vulnerable beneficiaries. *Journal*

of the American Medical Association: Internal Medicine, 176(8), 1167-1175. doi:10.1001/jamainternmed.2016.2827

Collet, T., Salamin, S., Zimmerli, L., Kerr, E., Clair, C., Picard-Kossovsky, M.,… Rodondi, N. (2011). The quality of primary care in a country with universal health care coverage. *Journal of General Internal Medicine, 26*(7), 724- 730. doi:10.1007/s11606-011-1674-0

Comfort, L., Shortell, S., Rodriguez, H., & Colla, C. (2018). Medicare accountable care organizations of diverse structures achieve comparable quality and cost performance. *Health Services Research, 53*(4), 2303-2323. doi:10.1111/1475-6773.12829

Conrad, D. (2015). The theory of value-based payment incentives and their application to health care. *Health Services Research, 50*(S2), 2057-2089. doi:10.1111/1475-6773.12408

Conrad, D., & Perry, L. (2009). Quality-based financial incentives in health care: Can we improve quality by paying for it? *Annual Review of Public Health, 30,* 357-371. doi:10.1146/annualrev.publichealth.03108.100243

Conrad, D. A., Vaughn, M., Grembowski, D., & Marcus-Smith, M. (2016). Implementing value-based payment reform. *Medical Care Research and Review, 73*(4), 437-457. doi:10.1177/1077558715615774

Creswell, J. (2009). *Research design: Qualitative, quantitative and mixed methods approaches*. Thousand Oaks, CA: Sage Publications.

DeCamp, M., Farber, N. J., Torke, A. M., George, M., Berger, Z., Keirns, C. C., & Kaldjian, L. C. (2014). Ethical challenges for accountable care organizations: A structured review. *Journal of General Internal Medicine, 29*(10), 1392-1399. doi:10.1007/s11606-014-2833-x

DeVore, S., & Champion, W. (2011). Driving population health through accountable care organization. *Health Affairs, 30*(1), 41-50.

Docteur, E., & Berenson, R. (2009). How does the quality of U.S. health care compare internationally? *Timely Analysis of Immediate Health Policy Issues, a series of policy briefs produced by the Urban Institute and the Robert Wood Johnson Foundation.* Retrieved from http://www.rwjf.org/content/dam/farm/reports/issue_briefs/2009/rwjf45145

Emmert, M., Eijkenaar, F., Kemter, H., Esslinger, A. & Schoffski, O. (2012). Economic evaluation of pay-for-performance in health care: A systematic review. *European Journal of Health Economics, 13*(6), 755-767. doi:10.1007/s10198-011-0329-8

Epstein, A., Jha, A., Orav, E., Liebman, D., Audet, A., Zerra, M., & Guterman, S. (2014). Analysis of early accountable care organizations defines patient, structural, cost and quality-of-care characteristics. *Health Affairs, 33*(1), 95-102. doi:10.1377/hlthaff.2013.1063

Evans, M., & Demko, P. (2015). Medicare's payment reform push draws praise and fears. *Modern Healthcare.* Retrieved from http://www.modernhealthcare.com/article/20150126/NEWS/301269813

Field, A. (2013). *Discovering statistics using IBM SPSS Statistics* (4th ed.). London, England: Sage.

Fingar, K., & Washington, R. (2015, November). *Trends in hospital readmissions for four high-volume conditions, 2009-2013* (Statistical Brief No. 196). Washington, DC: for Healthcare Research and Quality Agency.

Fisher, E., Shortell, S., Kreindler, S., Van Citters, A., & Larson, B. (2012). A framework for evaluating the formation, implementation and performance of accountable care organizations. *Health Affairs, 31*(11), 2368-2378. doi:10.1377/hlthaff.2012.0544

Frankfort-Nachmias, C., & Nachmias, D. (2008). *Research methods in the social sciences* (7th ed.). New York, NY: Worth.

Frankfort-Nachmias, C., Nachmias, D., & DeWaard (2015). *Research methods in the social sciences* (8th ed.). New York, NY: Worth.

Gächter, S., Orzen, H., Renner, E., & Starmer, C. (2009). Are experimental economists prone to framing effects? A natural field experiment. *Journal of Economic Behavior & Organization, 70*, 443-446.

Gehlert, S., Sohmer, D., Sacks, T., Mininger, C., McClintock, M., & Olopade, O. (2008). Targeting health disparities: A model linking upstream determinants to downstream interventions. *Health Affairs, 27*(2), 339-349.

Green, S. B., & Salkind, N. J. (2014). *Using SPSS for Windows and Macintosh: Analyzing and understanding data* (7th ed.). Upper Saddle River, NJ: Pearson.

Gu, Q., Koenig, L., Faerberg, J., Steinberg, C., Vaz, C., & Wheatley, M. (2014). The Medicare Hospital Readmissions Reduction Program: Potential unintended consequences for hospitals serving vulnerable populations. *Health Services Research, 49*, 818–837. doi:10.1111/1475-6773.12150

Holland & Knight, LLP. (2015*). MACRA, the sustainable growth rate (SGR) reform bill, signed into law.* Retrieved from http://www.jdsupra.com/legalnews/macra-the-sustainable-growth-rate-sgr-02071/

Institute of Medicine (U.S.) Committee on Choice and Managed Care, Jones S. B., & Ein L. M. (1996). *Improving the Medicare market: Adding choice and protections.* Washington, DC: National Academies Press. Retrieved from https://www.ncbi.nlm.nih.gov/books/NBK233029/

Institute of Medicine. (2001). *Crossing the quality chasm: A new health system for the 21st century.* Washington, DC: National Academy Press.

James, J. (2012). Health policy brief: Pay-for-performance. *Health Affairs.* Retrieved from https://healthaffairs.org/healthpolicybriefs/brief_pdfs/healthpolicybrief_78.pdf

Jha, A. (2013). Time to get serious about pay for performance. *Journal of the American Medical Association*, *309*(4), 347-348.

Joynt Maddox, K., Sen, A., Samson, L., Zuckerman, R., DeLew, N., & Epstein, A. (2017). Elements of program design in Medicare's value-based and alternative payment models: A narrative review. *Journal of General Internal Medicine, 32*(11), 1249-1254. doi:10.1007/s11606-017-4125-8

Kao, A. (2015). Driven to care: Aligning external motivators with intrinsic motivation. *Health Services Research, 50*(S2), 2216-2228. doi:10.1111/1475-6773.12422.

Kaufman, B. G., Steven Spivack, B., Stearns, S. C., Song, P. H., & O'Brien, E. C. (2017). Impact of Accountable Care Organizations on Utilization, Care, and Outcomes: A Systematic Review. *Medical Care Research and Review*, *00*(0), 1-36. https://doi.org/10.1177/1077558717745916

Kessler, E., Pegany, V., Keolanui, B., Fulton, B., Scheffler, R., & Shortell, S. (2015). Review of Medicare, Medicaid and commercial quality of care measures: Considerations for assessing accountable care organizations. *Journal of Health Politics, Policy and Law, 40*(4), 761-796. doi:10.1215/03616878-3150050

Khullar, D., Chokshi, D., Kocher, R., Reddy, A., Basu, K., Conway, P., & Rajkumar, R. (2015). Behavioral economics and physician compensation- promise and challenges. *The New England Journal of Medicine*, *372*(24), 2281-2283.

Kronick, R., Casalino, L., & Bindman, A. (2015). Apple pickers or federal judges: Strong versus weak incentives in physician payment. *Health Services Research, 50*(S2), 2049-2056. doi:10.1111/1475-6773.12424.

Larson, B., Van Critters, A., Kreindler, S., Carluzzo, K., Gbemudu, J., Wu, F., & Fisher, E. (2012). Insights from transformations under way at four brooking Dartmouth accountable care organization pilot sites. *Health Affairs, 31*(11), 2395-2406. doi:10.1377/hlthaff.2011.1219

Layton, T., & Ryan, A. (2015). Higher incentive payments in Medicare advantage's pay-for-performance program did not improve quality but did increase plan offerings. *Health Services Research, 50*(6), 1810-1828. doi:10.1111/1475-6773.12409

Lee, J., Maciejewski, M., Raju, S., Shrank, W., & Choudhry, N. (2013). Value-based insurance design: Quality improvement but no cost savings. *Health Affairs, 32*(7), 1251-1257. doi:10.1377/hkthaff.2012.0902

Lee, R. (2015). *Economics for healthcare managers*. Chicago, IL: Health Administration Press.

Luft, H. (2016). Policy-oriented research on improved physician incentives for higher value health care. *Health Services Research, 50*(S2), 2187-2214. doi: 10.1111/1475-6773.12423.

McWilliams, J., Chernew, M., Landon, B., & Schwartz, A. (2015). Performance differences in Year 1 of pioneer accountable care organizations. *The New England Journal of Medicine, 372,* 1927-1936. doi:10.1056/NEJMsa1414929

McWilliams, J., Chernew, M., Zaslavsky, A., & Landon, B. (2013). Post-acute care and ACOs - Who will be accountable? *National Institute of Health, Health Services Research, 48*(4), 1526-1538. doi:10.1111/1475-6773.12032

McWilliams, J., Hatfield, L., Chernew, M., Landon, B., & Schwartz, A. (2016). Early performance of accountable care organizations in Medicare. *The New England Journal of Medicine, 374,* 2357-2366. doi:10.1056/NEJMsa1600142

McWilliams, J., Landon, B., & Chernew, M. (2013). Changes in health care spending and quality for Medicare beneficiaries associated with a commercial ACO contract. *JAMA, 310*(8). doi:10.1001/jama.2013.276302

Meacock, R., Kristensen, S., & Sutton, M. (2014). The cost effectiveness of using financial incentives to improve provider quality: A framework and application. *Health Economics, 23,* 1-13.

Menon, A. & Kumar, M. (2014). Is "fee for service" a reverse incentive in the health care market of the united states. *The Internet Journal of Law, Healthcare and Ethics. 10*(1).

Muhlestein, D. (2015). Growth and dispersion of accountable care organizations in 2015. Retrieved from http://healthaffairs.org/blog/2015/03/31/growth-and-dispersion-of-accountable-care-organizations-in-2015-2/

New Hampshire Medical Society. (2016). *2016 Physician quality reporting system, payment adjustment fact sheet*. Retrieved from http://www.nhms.org/sites/default/files/Pdfs/CMS_PQRS_2016_factsheet.pdf

Nix, K. (2013). What Obamacare's pay-for-performance programs mean for health care quality. *The Heritage Foundation,* 2856.

Nyweide, D., Lee, W., Cuerdon, T., Pham, H., Cox, M., Rajkumar, R., & Conway, P. (2015). Association of pioneer accountable care organizations vs traditional Medicare fee for service with spending, utilization and patient experience. *JAMA, 313*(21), 2152-2161. doi:10.1001.jama.2015.4930

O'Donnell, R., Anand, N., Ganser, C., & Wexler, N. (2015). The accountable care organization results: Population health management and quality improvement programs associated with increased quality of care and decreased utilization and cost of care. *Family Medicine and Community Health, 3*(1), 0-38. doi:10.15212/FMCH.2015.0111

Osborne, J. (2010). Improving your data transformation: Applying the box-cox transformation. *Practical Assessment, Research &Evaluation, 15*(12). Retrieved from http://pareonline.net/pdf/v15n12.pdf

Ouayogode, M., Colla, C., & Lewis, V. (2017). Determinants of success in shared savings programs: an analysis of ACO and market characteristics. *Health Affairs, 5*(1-2), 53-61. doi:10.1377/hkthaff.2016.08.002

Pannucci, C., & Wilkins, E. (2010). Identifying and avoiding bias in research, *Plastic Reconstruction Surgery, 126*(2), 619–625. doi:10.1097/PRS.0b013e3181de24bc

Petersen, L., Woodard, L., Urech, T., Daw, C., & Sookman, S. (2006) Does pay-for-performance improve quality of health care? *Annuals of Internal Medicine, 145*(4), 265-272.

Pourhoseingholi, M., Baghestani, A. & Vahedi, M. (2012). How to control confounding effects by statistical analysis. *Gastroenterology and Hematology from Bed to Bench, 5*(2), 79-83.

Powers, B., Navathe, A., Chaguturu, S., Ferris, T. & Torchiana, D., (2016). Aligning incentives for value: The internal performance framework at partners healthcare. *Healthcare, 5*(3), 141-149. doi:10.1016/j.hjdsi.2016.04.007

Promberger, M., & Marteau, T. (2013). When do financial incentives reduce intrinsic motivation? Comparing behaviors studied in psychological and economic literatures. *Health Psychology, 32*(9), 950-957. doi:10.1037/a0032727

Rodwin, M. (2004). Financial incentives for doctors. *BMJ, 328,* 1347-1329.

Roland, M., & Dudley, A. (2015). How financial and reputational incentives can be used to improve medical care. *Health Services Research, 50*(S2), 2090-2115. doi:10.1111/1475-6773.12419

Rose, S., Zaslavsky, A., & McWilliams, J. M. (2016). Variation in accountable care organization spending and sensitivity to risk adjustment: Implications for benchmarking. *Health Affairs, 35*(3), 440-448. doi:10.1377/hkthaff.2015.1026

RTI International. (2015). Accountable care organization 2015 program analysis quality performance standards narrative measure specifications. Retrieved from http://www.uninet.com/files/7614/4139/4291/RY2015-Narrative-Specifications.pdf

Russell, L. (2010). *Fact sheet: Health disparities by race and ethnicity.* Retrieved from https://cdn.americanprogress.org/wp-content/uploads/issues/2010/12/pdf/disparities_factsheet.pdf

Salisbury-Afshar, E. (2012). *Financial incentives for improving the quality of primary care.* Retrieved from http://www.aafp.org/afp/2012/0401/p690.html

Scott, A., Liu, M., & Yong, J. (2016). Financial incentives to encourage value-based health care. *Medical Care Research and Review,* 1-30. doi: 10.1177/1077558716676594

Shadish, W., Cook, T., & Campbell, T. (2002). *Experimental and quasi-experimental designs for generalized causal inference*. Boston, MA: Houghton Mifflin. 623.

Shortell, S. (2016). Applying organization theory to understanding the adoption and implementation of accountable care organizations: Commentary. *Medical Care Research and Review,* 1-9. doi:10.1177/1077558716643477

Siddiqui, M., & Berkowitz, S. (2013). Shared savings models for ACOs- Incentivizing primary care physicians. *Journal of General Internal Medicine, 29*(6), 832-834. doi:10.1007/s11606-013-2733-5

Social Security Administration. (2016). *Research, statistics and policy analysis; Fast facts and figures about social security.* Retrieved from https://www.ssa.gov/policy/docs/chartbooks/fast_facts/index.html

Song, Z., Rose, S., Safran, D., & Landon, B. (2014). Changes in health care spending and quality 4 years into global payment. *The New England Journal of Medicine, 371*, 1704- 1714.

Spencer, C., Gaskin, D. & Roberts, E. (2013). The quality of care delivered to patients within the same hospital varies by insurance type. *Health Affairs*, *32*(10), 1731-1739. doi:10.1377/hithaff.2012.1400

Teitelbaum, J. B., Riegelman, R., & Wilensky, S. E. (2015). *2015 annual health reform update [Supplemental material*], 1-47. Burlington, MA: Jones & Bartlett Learning.

Torchiana, D., Colton, D., Rao, S., Lenz, S., Meyer, G. & Ferris, T. (2013). Massachusetts General Physicians' Organization's quality incentive program

produces encouraging results. *Health* Affairs, *32*(10), 1748-1756. doi:10.1377/hlhaff.2013.0377

Trochim, W. (2006). *Research methods knowledge base.* Retrieved from http://www.socialresearchmethods.net/kb/scaling.php

Vogus, T., & Singer, S. (2016). Unpacking accountable care: Using organization theory to understand the adoption, implementation, spread, and performance of accountable care organizations. *Medical Care Research and Review*, 1-6. doi: 10.1177/1077558716640410

Werner, J. (2012). *High reliability organization theory as an input to manage operational risk in project management.* Unpublished manuscript, Graduate division of the School of Arts and Sciences, University of Pennsylvania. Philadelphia, PA.

Werner, R., Kolstad, J., Stuart, E., & Polsky, D. (2011). The effect of pay-for-performance in hospitals: Lessons for quality improvement. *Health Affairs, 30*(4), 690-698. doi:10.1377/hlthaff.2010.1277

Williams, D., Costa, M., Odunlami, A., & Mohammad, S. (2008). Moving upstream: How interventions that address the social determinants of health can improve health and reduce disparities. *Journal of Health Management Practice, 14* (S8-17). doi:10.1097/01.PHH.0000338382.36695.42

Williams, S. J., & Torrens, P. R. (2008). Introduction to health services (ed.). Clifton Park, New York, NY: Delmar Learning.