
[All ETDs from UAB](#)

[UAB Theses & Dissertations](#)

2022

Shared Savings Bonus in MSSP and Its Association With Length of Participation

Terry D. Knight
University Of Alabama At Birmingham

Follow this and additional works at: <https://digitalcommons.library.uab.edu/etd-collection>



Part of the [Medical Humanities Commons](#)

Recommended Citation

Knight, Terry D., "Shared Savings Bonus in MSSP and Its Association With Length of Participation" (2022).
All ETDs from UAB. 315.
<https://digitalcommons.library.uab.edu/etd-collection/315>

This content has been accepted for inclusion by an authorized administrator of the UAB Digital Commons, and is provided as a free open access item. All inquiries regarding this item or the UAB Digital Commons should be directed to the [UAB Libraries Office of Scholarly Communication](#).

SHARED SAVINGS BONUS IN MSSP AND ITS ASSOCIATION WITH LENGTH
OF PARTICIPATION

by

TERRY D. KNIGHT

NANCY BORKOWSKI, CHAIR
NATHANIEL CARROLL
WILLIAM OPOKU-AGYEMAN
DEAN G. SMITH

A DISSERTATION

Submitted to the graduate faculty of The University of Alabama at Birmingham,
in partial fulfillment of the requirements for the degree of
Doctor of Science

BIRMINGHAM, ALABAMA

2022

Copyright by
Terry D. Knight
2022

SHARED SAVINGS BONUS IN MSSP AND ITS ASSOCIATION WITH LENGTH OF PARTICIPATION

TERRY D. KNIGHT

HEALTH SERVICES ADMINISTRATION

ABSTRACT

Accountable Care Organizations (ACOs) are integrated groups of providers responsible for reducing cost and improving quality for a group of individuals. Medicare began using these organizations in 2012, after the passage of the Affordable Care Act (ACA), to move away from traditional fee-for-service reimbursement. This alternative payment model is the Medicare Shared Savings Program (MSSP). MSSP affords ACOs the opportunity to receive a portion of the savings they achieve if specific cost targets and quality benchmarks are met. Length of participation time in the alternative payment model may increase the ACOs' ability to achieve savings. The analysis of MSSP savings and length of participation was framed within the context of Knowledge-Based Theory, which posits that learning how to manage within the MSSP over time may yield better results.

The Centers for Medicare and Medicaid Services publishes ACO cost and performance data on www.data.CMS.gov for public use. The analysis utilized data from 2018 to determine if there was an association between participation time (ACO age) and medical cost savings.

Hypotheses were tested using a t-test and regression analyses. Each additional year of ACO was associated with an average of \$772,352.80 of gross savings ($p = 0.002$).

Additionally, ACO age was correlated with achievement of a shared savings bonus as ACOs had 1.24 ($p < 0.000$) times the odds of achieving bonus for each additional year of participation/age. The findings suggest that ACO age is a factor that may contribute to the savings and bonuses of ACOs.

DEDICATION

To my family and friends who provided significant encouragement. Specifically, Christy Knight, who showed unwavering support during this journey.

ACKNOWLEDGMENTS

Dr. Nancy Borkowski demonstrated great patience and provided appropriate encouragement during this process. Without her guidance and direction, this dissertation would not have been possible. Dr. William Opoku-Agyeman guided me through the study's analysis phase and helped me with understanding the appropriate regression analysis to use. The remainder of my committee provided vital feedback and helped narrow the study to a manageable and meaningful research project.

I would like to thank the entire faculty of the Executive Doctoral Program in Healthcare Leadership for their commitment to advancing leaders in healthcare. This program encouraged me to think beyond the current boundaries that exist to find solutions to the complex problems we face in healthcare. I am proud to have been a part of the program.

Finally, I would like to thank Brad Rollow and VIVA Health, Inc. for the opportunity to pursue this degree. Brad's mentorship and encouragement to start and finish this journey were invaluable.

TABLE OF CONTENTS

	<i>Page</i>
ABSTRACT.....	iii
DEDICATION.....	v
ACKNOWLEDGEMENTS.....	vi
LIST OF TABLES.....	x
LIST OF FIGURES.....	xi
LIST OF ABBREVIATIONS.....	xii
CHAPTER	
1 INTRODUCTION.....	1
Understanding the Organizational Needs for Successful MSSP Participation.....	4
Research Questions.....	8
2 LITERATURE REVIEW.....	10
Introduction.....	10
Background.....	11
Early Studies of MSSP.....	12
Pioneer Model.....	15
Medicare Shared Savings Program.....	16
Track 1.....	17
Track 2.....	18

	<i>Page</i>
Track 3	19
Next Generation ACO Model	19
Pathways to Success Model	20
Impact of Costs to the ACO	21
Theory and Conceptual Framework.....	23
Knowledge Theory.....	23
3 RESEARCH METHODS	27
Study Design and Data Sources	27
Data Collection	27
Data Analysis	28
Dependent Variables	30
Independent Variable.....	31
Control Variables.....	31
Analytical Strategy.....	32
4 RESULTS	34
Hypothesis 1.....	37
Hypothesis 2.....	39
5 DISCUSSION	42
Interpretation of Findings	42
Study Limitations.....	46
Implications.....	47
Future Research... ..	48
Conclusion... ..	49

	<i>Page</i>
REFERENCES	51
APPENDIX.....	57
UNIVERSITY OF ALABAMA AT BIRMINGHAM INSTITUTIONAL REVIEW BOARD APPROVAL LETTER	58

LIST OF TABLES

	<i>Page</i>
1 Variables-listing of Variables and Descriptions	29
2 Descriptive Statistics.....	36
3 Regression Model Output for Hypothesis 1.....	38
4 T-test Output for Hypothesis 2	39
5 Logistic Regression Model for Hypothesis 2.....	40

LIST OF FIGURES

	<i>Page</i>
1 MSSP ACO Quality Performance Scores by Year	3
2 ACO Experience and Knowledge Model	8
3 MSSP ACO Track Participation by Year	21
4 Conceptual Framework	26
5 Medicare Beneficiaries 2018	35
6 Data on Previous Year's Performance for ACOs Achieving Bonus in Performance Year 2018	45
7 Data on Previous Year's Performance for ACO Not Achieving Bonus in Performance Year 2018	46

LIST OF ABBREVIATIONS

ACO	Accountable Care Organization
AHA	American Hospital Association
AWI	Area Wage Index
CMMI	Centers for Medicare & Medicaid Services Innovation Center
CMS	Centers for Medicare & Medicaid Services
DRG	Diagnosis-Related Group
EHR	Electronic Health Record
FQHC	Federally Qualified Health Center
GDP	Gross Domestic Product
HMO	Health Maintenance Organization
KBT	Knowledge-Based Theory
MLR	Minimum Loss Rate
MSR	Minimum Savings Rate
MSSP	Medicare Shared Savings Program
OECD	Organisation for Economic Co-operation and Development
OIG	Office of Inspector General
PCP	Primary Care Physician
PGPD	Physician Group Practice Demonstration
PGP	Physician Group Practice
PPACA	Patient Protection and Affordable Care Act
PPO	Preferred Provider Organization
PUF	Public Use File

CHAPTER 1

INTRODUCTION

Misaligned financial incentives and fragmentation have long plagued the United States health care delivery system. Rising costs and diminished care quality have concerned healthcare leaders for years (Nattinger et al., 2018). For over five decades, the United States has been searching for a panacea to resolve the escalating cost issue in health care while maintaining or improving quality.

President Richard Nixon was amongst the first to ring the cost-crisis bell in 1969, indicating that without intervention, the United States would have a system break down (Marmor & Oberlander, 2012). Consequently, the stage was set for cost containment organizations such as Health Maintenance Organizations (HMOs) and Preferred Provider Organizations (PPOs) to emerge in the early 1970s as vehicles to reduce rising costs (Scutchfield et al., 2012). According to the Centers for Medicare and Medicaid Services (CMS), health expenditure as a percentage of the gross domestic product (GDP) was 6.9% in 1970, rising to 17.6% in 2018 (a 155% increase during the period), evincing these organizations were not the answer to the unbridled rise in health care spending (CMS, 2022a)

United States spending for 2018 was almost twice as much as peer countries in the Organisation for Economic Co-operation and Development (OECD), with quality

metrics registering near the bottom on many key categories such as obesity and life expectancy (Tikkanen & Abrams, 2020). Health care cost escalation, combined with below-average quality metrics, triggered policymakers to consider alternative payment models and reimbursement methodologies. Moving from fee-for-service to alternative payment arrangements has been advanced as the key to controlling costs and improving quality.

One such alternative payment arrangement that has gained traction in recent years is Accountable Care Organizations (ACOs). ACOs integrate hospitals, physicians, and other health care providers in a collaborative organization focused on coordinating care and eliminating over-utilization. The ACO manages patient populations in a way that reduces gaps in care and encourages efficient use of health care resources (CMS, 2021a).

Under the Medicare Shared Savings Program (MSSP), ACOs have become the primary vehicle used by Medicare to transition from volume (i.e., fee-for-service) to value (quality/cost) (Horrigan, 2015). CMS has suggested that more significant reimbursement amounts will be tied to value-based arrangements in future years, encouraging healthcare systems and other providers of care to consider implementing MSSP ACOs (Horrigan, 2015). Thus, the number of participants has grown substantially to 477 MSSP ACOs participating in the 2021 performance year (CMS, 2022b). Government and commercial payers across the country now use the ACO model, with over 10% of all persons with insurance coverage falling under a private or governmental ACOs (Hush, 2018).

MSSP ACOs can select from either a one-sided risk model that allows for a financial reward if healthcare costs for their fee-for-service Medicare population are

lowered from previous years' spending or the two-sided model that requires the ACO to pay a penalty to CMS if overspending occurs during the measurement year (Ouayogode et al., 2017). Under either option, providers are rewarded for achieving cost targets.

The potential financial reward may be the primary driver of the business growth of ACOs; however, other outcomes provide benefits to the patients covered under ACOs, such as care coordination across multiple care settings and increased preventative care. Early results from ACO quality reporting reflect higher preventive care screenings and improvement in most quality metrics monitored under the MSSP program (Walker, 2015). Each measure is assigned a point value based on national benchmark performance. Quality measures within the 30th to 90th percentile are counted in the ACO's overall quality score, and scores increase with higher performance. Figure 1 reflects that ACOs have increasingly met the quality standards since 2012, with less than 1% of the participating ACOs in 2018 not meeting their target performance score.

Figure 1

MSSP ACO Quality Performance Scores by Year

Quality Performance Standard	2012	2013	2014	2015	2016	2017	2018
Met Quality Performance Standard	109 (96%)	214 (97%)	322 (97%)	388 (98%)	428 (99%)	468 (99%)	546 (99.6%)
Did not Meet Quality Performance Standard	5 (4%)	6 (3%)	11 (3%)	9 (2%)	4 (1%)	4 (1%)	2 (<1%)
Total Number of ACOs	114	220	333	397	432	472	548

Medicare Shared Savings Program Quality Performance Results Compiled from 2012-2018 (CMS, 2021b)

Research has shown that ACOs participating in the MSSP have improved quality and saved CMS money (McWilliams et al., 2016; OIG, 2017; Shortell et al., 2015). Early research has suggested that ACOs with more experience in the program were more likely to achieve savings and quality metrics (Walker, 2015).

Despite the overall improvement of quality metrics and cost savings produced collectively by ACOs participating in the MSSP, it can be difficult for an individual ACO to achieve high enough savings to qualify for a financial bonus under the program. In 2017, 66% of ACOs saved Medicare money totaling \$739.4 million; however, only 37% of ACOs in the program attained a savings level adequate to receive a ‘shared savings’ bonus from CMS (LaPointe, 2019). Consequently, an important question is what factors increase an ACO's ability to achieve a shared savings bonus? One factor suggested by industry experts that may substantially affect achieving savings is knowledge gained through experience in the program. Little research has examined the influence of longevity of participation on an ACO's ability to achieve a shared savings bonus.

Understanding the Organizational Needs for Successful MSSP Participation

Medicare beneficiaries do not have to enroll in the program; instead, the beneficiaries are automatically assigned to an ACO by CMS based on their past claims history. In other words, the beneficiary is attributed to a specific ACO if the majority of claims for primary care services were submitted to CMS by primary care providers within the ACO's contracted network. This assignment procedure allows CMS to calculate the total costs more concisely. Beneficiaries cannot opt-out or disenroll from the ACO, and the ACO is held responsible for all health services costs of its assigned

beneficiaries. Due to this assignment procedure, ACOs cannot directly or indirectly cherry-pick healthier patients to decrease medical coverage costs.

Part A and Part B costs for beneficiaries are utilized by CMS to calculate the benchmark cost for the ACO's current year and are actuarially set based on traditional Medicare fee-for-service expenses. Cost targets vary based on the ACO's track; however, the minimum cost reduction to achieve shared savings is 2% (CMS, 2021b). Therefore, appropriate systems and processes are crucial to effectively managing the assigned Medicare population.

The structure and process ACOs implement to provide care, and coordinate services are not uniform. MSSP ACOs are very diverse organizations, likely due to CMS intentionally not specifying a required organizational structure for their participation. Many successful ACOs have determined that data distribution and data transparency are keys to reaching their goal of improving care quality and lowering costs (Salhany et al., 2018). While not required, many ACOs have implemented an electronic health records (EHR) to help manage the data needed to operate effectively (Wang & Byrd, 2017). In addition to domestic data generated by participating providers in the ACO, CMS provides claims data from all providers on the attributed beneficiaries, which can help gain a complete clinical picture of each patient (CMS 2021c). Many ACOs use their EHRs to organize the CMS data and report quality and cost data required to remain compliant with CMS. While lack of communication between providers has limited the quality and effectiveness of the health care systems in the past, technology and better processes have improved today's care (Blackstone & Fuhr, 2016). Proper information management improves the ACO's ability to be proactive in managing patients and reporting data (Gray

& Sheiko, 2016). Management of data is a critical component of success, and significant performance improvement has been linked to organizations that can effectively utilize available knowledge within the organization (Harvey et al., 2015).

As previously explained, ACOs gain knowledge and understanding through data collected on Medicare patients under the MSSP. A benefit of participating in the MSSP is that CMS provides all claims data for patients attributed to the ACO. Capitalizing on the data, and developing operational process improvement likely make the ACOs more effective at achieving shared savings over time. Identifying disease categories that have high expenses and implementing actions that help mitigate the claims cost can help the ACO bend the cost curve. Research noted that becoming proficient in care management and reducing duplicative services are vital actions ACOs can deploy to minimize expense. Eliminating or reducing avoidable expensive hospital admissions has been identified as a critical cost reduction strategy for successful ACOs (Blackstone & Fuhr, 2016).

Several studies have been conducted on ACO performance under MSSP, primarily during the program's initial two to three years. Studies on ACO performance in the MSSP have broadly fallen into three main categories:

- Initial review of success (Pioneer ACOs and early MSSP ACOs)
- General characteristics of all ACOs
- Characteristics of successful ACOs

While there have been numerous studies on the early years of the ACOs and the attributes or structure associated with success, few studies have attempted to look at the length of participation in the program to determine if it has impacted MSSP success. Since attaining a shared savings bonus is essential to the ACO's sustainability, and a

limited number achieve the bonus each year, it is imperative to understand the factor(s) that may impact achieving shared savings. ACOs must develop processes to improve using the knowledge obtained through internal and external data.

Viewing ACOs through the lens of Knowledge-Based Theory (KBT) allows for an understanding of an ACO's ability over time to develop infrastructure to support operations conducive to lowering the cost of care. KBT's primary premise is that employees of a firm learn or develop wisdom allowing for higher levels of coordination (Miles, 2012). While the origins of KBT are unclear, several researchers have contributed to the theory in recent decades and provided more insight into how knowledge can be integrated and exploited for a firm's benefit (Grant et al., 1992; Nonaka, 1994).

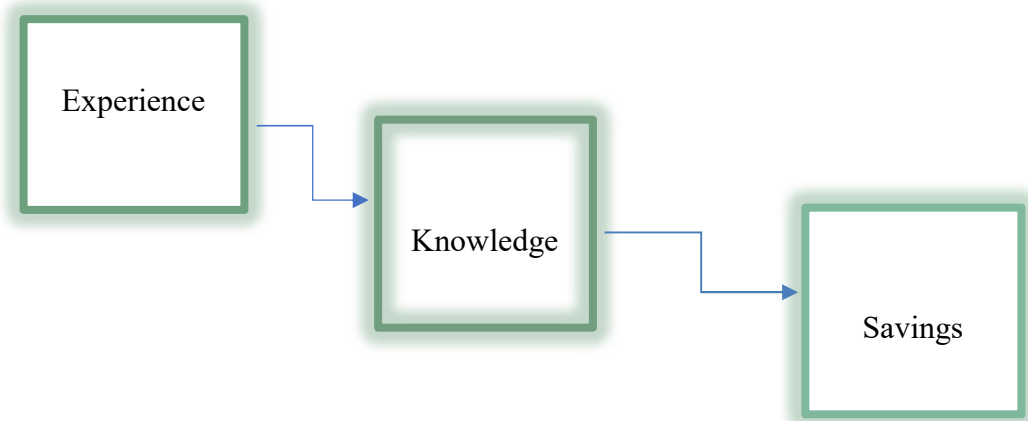
ACOs must develop a more profound knowledge of drivers of care costs while also referring patients to more cost-effective treatment providers such as surgery centers and outpatient centers (McWilliams et al., 2017). Determining cost-effective providers requires a review of data and implementing a process to ensure consistent use of these providers. The clinical and administrative staff of an ACO likely develop wisdom over time as they review cost data and quality data. Seemingly, as the ACO matures in the program, the staff of the ACO would learn from information gathered by the entity. Applying KBT allows for a better understanding of how experience, data, and refinement of the internal process may provide the ACO with the appropriate expertise and structure to achieve bonuses in the MSSP.

Research Questions

A pertinent fact to confirm is if longevity in the program makes the ACO more effective in achieving savings. Early research had indicated that a longer time in the program might lead to higher levels of success, and a recent review of savings data reflected that more mature ACOs achieved more savings for CMS (Verma, 2020). Therefore, it is essential to quantify savings associated with additional program participation time. Figure 2 illustrates the influence of knowledge on the ACO, allowing it to gain experience in the MSSP.

Figure 2

ACO Experience and Knowledge Model



It has been reported that mature ACOs produce more savings for CMS (Verma, 2020). It is important to determine if participation time is associated with savings, therefore the following study question is offered:

- *Does the length of participation time in MSSP produce a positive contribution to savings?*

While reports from CMS have indicated mature ACOs achieve more significant savings, there is a void of research on participation time and bonuses using appropriate

theory. Longevity in the savings program may impact an ACO's ability to garner enough shared savings to achieve a bonus. This leads to an additional study question:

- *Is there an association between ACO maturity and achieved Medicare shared savings bonuses?*

CHAPTER 2

LITERATURE REVIEW

Introduction

As mentioned previously, MSSP growth continues with almost one-third of all Medicare beneficiaries receiving care from a provider participating in an ACO contracted with the program (Mechanic & Gaus, 2018). Startup costs associated with forming an ACO to contract with CMS for MSSP can range between \$1 million and \$4 million and average approximately \$2 million (Terry, 2012). At best, ACO savings may come slowly as the complexities associated with the development of process and care management take time to establish. ACOs must enter three-year contracts with CMS for the MSSP program (CMS 2021d). It is possible for an ACO participating in MSSP to go through the entire three-year term and not achieve shared savings. The formula is complex; however, the concept is simple. ACOs receive an MSSP bonus if they keep total Medicare spending below the target spending amounts determined to be the baseline costs and achieve quality benchmarks (Antos & Capretta, 2019). ACO leaders evaluating continued participation in MSSP or those considering ACO formation and entrance into MSSP, are likely mindful that only a relative few ACOs achieve enough shared savings to receive a bonus payment. Research on factors that contribute to or hinder success could help ACO leaders develop strategies for greater success in the MSSP.

This chapter describes how the MSSP has performed and evolved over recent years and summarizes relevant literature regarding the performance of ACOs in the program.

Background

As discussed previously, health care costs have been growing at an unsustainable rate for many years. Literature suggests that the government will play a significant role in controlling health care expenditures. Given that the government is one of the largest funding sources for health care, accounting for approximately 25% of health care expenditures, the federal government has a significant influence on the construct of the market (Troy, 2015). CMS, the government's body that determines health care payments and programs, has pushed for a transition towards value-based or alternative payment models in recent years (Bell, 2011).

On April 10, 2012, the Centers for Medicare and Medicaid Services (CMS) announced that 27 ACOs were selected to participate in the Pioneer ACO program, which would provide incentives for reducing health care spending while improving quality, but required participants to take downside risk if costs were not lowered. Simultaneous to the Pioneer ACOs, other evolving ACOs entered contracts with CMS in 2012 to participate in the MSSP, which allowed the ACO to select either Track 1 (shared savings only) or Track 2 (shared savings with risk if costs exceed set targets). Many of these ACOs were less experienced with alternative payment models and were developing care management capabilities and cost containment processes in the infancy stages. The Pioneer ACOs and

other ACOs contracted with CMS in 2012 totaled 114 ACOs and comprised the initial MSSP (CMS 2021e).

PPACA required CMS to utilize alternative models for reimbursement, which incentivize providers to become more aware of the cost and value of care. This legislation also required CMS to experiment with ACOs to determine if they can help to bend the cost curve through relaxation of anti-kickback laws and allowing providers to share in savings they achieve for the program (Bell, 2011).

ACOs participating in MSSP covered approximately 1.7 million lives at the program's start in 2012, growing to 10.5 million lives by 2018. In 2018, there were 561 ACOs compared to 220 in 2012 (CMS, 2022b). The growth in ACO participants demonstrated many providers' interests in transitioning from fee-for-service reimbursement to an alternative payment model.

Early Studies of MSSP

What is considered by many to be the sentinel study of MSSP was published in 2016 by McWilliams and colleagues. This early study used Medicare claims data from 2009 to 2013, measuring the costs of ACO participants entering the program in 2012 and 2013. The researchers utilized a differences-in-differences design to compare ACOs before and after MSSP. Study results showed improvement in the quality metrics for the ACOs but had mixed results on costs, with 2012 MSSP entrants achieving savings and 2013 entrants achieving virtually no savings. This study was also the first study to identify more significant savings in primary care groups that are independent than groups that are hospital integrated (McWilliams et al., 2016).

Subsequent to the McWilliams and colleagues' study, the Office of Inspector General (OIG) released a report in 2017 after reviewing 2012 through 2014 MSSP ACO data. The OIG report confirmed the previously identified improvements in quality and concluded the ACOs outperformed fee-for-service providers on 81% of the established quality metrics. The OIG report also indicated a \$1 billion in net spending reduction over the three years (OIG, 2017).

There has been limited evidence linking provider characteristics to success under value-based payment arrangements in general; however, several key studies about ACOs and performance characteristics have been conducted. Shortell et al. (2015) utilized the National Survey of Accountable Care Organizations, which collected data including ACO payer contracts, number of attributed patients, care management abilities, types of services offered, and developed a three-cluster taxonomy. The taxonomy consisted of integrated delivery systems (generally hospital-led), smaller physician-led, and hybrid (shared hospital and physician leadership) (Shortell et al., 2015).

Much of the savings comes from avoiding unnecessary admissions and readmissions, which puts hospital-led ACOs in conflict over savings versus fee-for-service revenue (Bobbitt, 2014). Emerging data suggest physician-led ACOs may be more successful at lowering the cost of care.

More recent published studies have expanded to look at determinants of success and market characteristics. Notably, Ouayogode et al. published research in 2016, which reviewed the first year of MSSP program data (2012) and reviewed financial performance in association with the following characteristics, among others:

- Provider composition within the ACO
- ACO contract start date

- Financial benchmark
- Market competition
- Beneficiary characteristics

Research results identified that ACOs with more significant initial benchmarks and prior experience with risk-bearing contracts were positively correlated with an increased likelihood of achieving a shared savings bonus. However, the organizational structure was not a consistent predictor of performance (Ouayogode et al., 2017).

Several studies have looked at internal and external factors of the financial performance of ACOs; however, no studies to date have looked at length of time in the program as a key indicator of shared savings performance. This gap in research and literature presents an opportunity, as some have suggested, that mature ACOs produce more savings for CMS (Verma, 2020).

A precursor to MSSP, the Physician Group Practice Demonstration (PGPD), was initiated by CMS in 2005 and was a pilot program to test a health care payment program that incorporated incentives for cost reduction and improved quality. Originating from the law that created Part D (medication coverage) for the Medicare program, the PGPD operated from 2005 to 2010. Under the pilot program, Medicare selected 10 large practice groups to participate and included 220,000 beneficiaries (CMS 2021f). This program was CMS' first test of a value-based payment arrangement.

PGPD offered a cost savings incentive bonus and allowed up to 80% of generated savings as a bonus. The physician group was required to achieve at least a 2% reduction in costs for combined Medicare Part A and Part B compared to their local market (CMS, 2021f). In addition to cost savings, Medicare introduced 32 quality measures that focused on improved patient outcomes. The metrics consisted primarily of screenings, testing, and

preventative care, and CMS set benchmarks for the measures. The participating groups were required to report on these metrics annually, and bonus payments distributed were weighted equally between cost reduction and quality (CMS, 2021f). Over the five years of the program, participating physician groups saved Medicare 134.1 million dollars and marked improvement across all quality measures reflecting a successful demonstration program and provided the basic structure for MSSP.

Pioneer Model

The Center for Medicare and Medicaid Innovation (CMMI), an institution set forth under the PPACA legislation, devised the structure and requirements for the Pioneer ACO demonstration program. CMS selected 32 organizations with previous experience in value-based payment models to begin as Pioneer ACOs for the program's first year in 2012. Several Pioneer ACOs were selected from provider groups who participated in the Physician Group Practice (PGP) Demonstration, which CMS began in 2005. PCP Demonstration introduced the concept of sharing savings with groups that could lower costs by greater than 2% and meet a minimum level of 32 quality metrics. PGPs were multispecialty groups affiliated with academic medical centers like the University of Michigan and Dartmouth. Non-academic medical groups were also included, such as Geisinger and Marshfield Clinic (Wilensky, 2011). CMS's savings benchmarks and quality targets for the MSSP program were very similar to the benchmarks and targets developed during the PGP Demonstration.

The first two performance years of the Pioneer Model utilized a shared savings and shared losses payment arrangement. This model offered a higher reward and risk than

the Shared Savings Program. Previous spending was calculated for each Pioneer ACO, and a trend in the expense was calculated from the national Medicare data and added to the benchmark. Beginning in year three of the program, ACOs that earned savings in the first two years were allowed to move to a population-based payment which was essentially a capitation payment for the attributed beneficiaries. The capitation payment was paid monthly per member and was designed to transition the ACO from a fee-for-service environment to prospective monthly payment. The Pioneer Model required each ACO to have a minimum of 15,000 aligned beneficiaries unless they were in a rural market which required a minimum of 5,000 beneficiaries (CMS, 2011g)

The Pioneer ACO model was set up so that the original entrants could exit, but no new ACOs could enter, which led to attrition over the period in which the model existed. Many Pioneer ACOs struggled with meeting the benchmarks set for performance and financial savings, causing them to drop out of the program (Ilene, 2015). Ultimately, in 2016, CMS sunset the Pioneer Model when only nine of the 32 ACOs remained.

Medicare Shared Savings Program

As mentioned earlier, the generally agreed upon definition of an ACO is an entity made up of integrated providers who are collectively held accountable for improving the quality of care and reducing the cost of care (Burke, 2011). How the entity is structured to achieve higher quality, and lower cost varies. A survey of ACOs between October 2012 and May 2013 by Health Affairs identified that most ACOs (51%) were physician-led, with 33% more jointly-led by physicians indicating physician leadership in the ACOs has emerged as a critical component (Colla et al., 2014).

While a specific leadership structure is not specified, CMS requires a governance structure that maintains the authority to execute the necessary functions of the ACO and has representation from the beneficiaries covered by the ACO (CMS 2022c). A Medicare beneficiary served by the ACO must be a part of the governing body to ensure patient representation. The ACO is required to be a licensed entity in the state(s) in which it operates and has some organization requirements, including:

- Receive and distribute shared savings (if achieved)
- Repay shared losses or other penalties determined to be owed back to CMS
- Report health care quality and performance standards data

An ACO is required to have an executive, or the like, appointed by the ACO's governing body and ensure the ACOs management structure and systems align with the MSSP three aims: better care for individuals, better health for populations, and lower growth in expenditures (CMS, 2022c).

Similar to the Pioneer ACO Model, MSSP organizations must have a minimum number of patients to participate in the program. However, MSSP ACOs are only required to have 5,000 or more beneficiaries attributed for participation (Ouayogode et al., 2017).

Track 1

ACOs who selected participation in Track 1 choose a one-sided risk model where they can only receive bonus dollars for lowering costs below benchmark and meeting quality targets. The cost benchmark was calculated similarly to the Pioneer Model using three years of historical expenditures. CMS applied a growth rate for inflation and trended the costs forward. The required Minimum Savings Rate (MSR) the ACO had to

achieve for bonus varied between 2% and 3.9% depending on the size (number of beneficiaries) of the ACO. Smaller ACOs who only met the minimum number of 5,000 beneficiaries were subject to an MSR of 3.9%, while larger ACOs accepting cost responsibility for 60,000 or more beneficiaries were subject to an MSR of 2% (CMS, 2011). Larger ACOs became eligible for bonuses by achieving a lower percentage of savings relative to smaller ACOs.

All ACOs who chose this model received their standard fee-for-service payments from Medicare for services provided to the beneficiaries and would only receive bonus dollars if the minimum MSR is achieved and quality metric standards were met. Once the MSR and quality target metrics were achieved, the ACO qualified for a bonus amount of 50% of the savings. ACOs who chose Track 1 were not subject to penalty or repayment to CMS if the costs in the performance year were higher than the benchmark costs (CMS, 2011).

Track 2

ACOs that chose to participate in Track 2 selected a two-sided risk model where they would receive bonus dollars for lowering costs below the benchmark; however, they also agreed to repay CMS if the costs exceeded the benchmark. The required MSR for an ACO selecting Track 2 also varied based on the size of the ACO; however, these ACOs agreed to a Minimum Loss Rate (MLR). This meant that if the cost exceeded the benchmark, the ACO would have to repay a portion of the excess cost to CMS. The MLR also varied based on the size of the ACO, and CMS placed a limit on the amount of repayment the ACO would have to make should a loss occur. More importantly, Track 2

ACOs qualified for a bonus amount of 60% of the savings it achieved. Like Track 1 ACOs, Track 2 ACOs received their standard fee-for-service payments from Medicare for services provided to the beneficiaries. They would only receive bonus dollars if the minimum MSR was achieved and quality metric standards were met (CMS, 2011).

Track 3

Track 3, added as an option for ACOs in 2016, utilized successful components of the Pioneer Model and blended them into the MSSP, offering higher shared savings and greater risk opportunities (CMS, 2015). Track 3 ACOs qualified for a bonus amount of 75% of the savings it achieved; however, it had a higher repayment amount than the other tracks if the MLR was exceeded. As with the other tracks, fee-for-service payments from Medicare for services provided to the beneficiaries were made to the ACO, and it would only receive bonus dollars if the minimum MSR was achieved and quality metric standards were met (CMS, 2015).

Next Generation ACO Model

In 2016, CMS launched a new model of ACO, commonly referred to as Next Generation ACOs (Daly, 2016). Critics of this model suggested it pushed ACOs closer to Medicare Advantage financial risk levels for the organizations and that well-funded elite health care systems could only select the model due to the risk exposure. The Next Generation Model offered a new benchmarking methodology that used a prospective calculation rather than a retrospective method outlined previously. In addition, ACOs electing to participate in this model were allowed to test incentives for beneficiaries to help discourage out-of-network utilization (Daly, 2016). The National Association of

Accountable Care Organizations (2016) published a comparison chart outlining the difference between the previous MSSP tracks and the Next Generation. The chart reflected that ACOs could choose from two risk arrangements of 85% and 100% of savings and losses. This eliminated the need for MLR and MSR targets and put the ACO in line to share in first dollar savings for savings over the benchmark while placing them at risk for the first dollar shared losses if spending exceeds the benchmark.

Pathways to Success Model

Some critics of the MSSP model expressed concerns that Track 1 (upside-only) model ACOs may not be bending the cost curve and may, in fact, be increasing Medicare spending. This criticism was eliminated when CMS retired Track 1 and Track 2 models and replaced them with a new track called *Basic*, which substantially reduces the time an ACO can participate in upside-only risk. The Track 3 model was retained and renamed *Enhanced*. The new tracks: Basic and Enhanced, retained most of the programmatic requirements of the models they replaced; however, they were intended to increase savings for Medicare by forcing ACOs into the two-sided risk model more quickly or exit the program (Perez, 2019). Pathways to success brought substantial changes to MSSP; these changes are beyond the scope of the current study. This study examined ACOs in the performance year 2018, which was the last year before Pathways to Success was initiated. Figure 3 below shows the number of ACOs participating in each track from 2012 through 2018. Track 1 has consistently had the most participants since the inception of the MSSP.

Figure 3*MSSP ACO Track Participation by Year*

Year	Program Size	Attributed beneficiaries	Track 1	Track 2	Track 3
2012	114 ACOs	1.7 million	107	7	NA
2013	106 ACOs	1.6 million	105	1	NA
2014	338 ACOs	4.9 million	333	5	NA
2015	404 ACOs	7.3 million	401	3	NA
2016	433 ACOs	7.7 million	411	6	16
2017	480 ACOs	9.0 million	438	6	36
2018	561 ACOs	10.5 million	460	8	38

Compiled from CMS Fast Facts Medicare Shared Savings Program ACOs 2012-2018 (CMS, 2022b)

Impact of Costs on the ACO

Benefit payments made by Medicare in 2018 totaled \$731 billion. Medicare Part A accounted for \$303 billion, Part B \$333 billion, and Part D \$95 billion. As discussed previously, MSSP ACOs are responsible for Part A and Part B spending on their attributed population. Excluding Part D expenditures, benefit costs in 2018 for Part A and Part B totaled \$636 billion, with Part A representing 48% of the combined spending (Cubanski et al., 2019). Part A spending by Medicare is primarily for hospital services. Therefore, hospital spending is a key focus of ACO leadership.

Hospital payments for Medicare patients included in ACOs, and those who are not included in ACOs, are calculated using an inpatient prospective payment system (IPPS) created in 1983. The IPPS bundles inpatient services into a single case called Medicare Severity-Diagnosis Related Group (MS-DRG) or DRG. This payment methodology incentivizes hospitals to provide care efficiently and expeditiously, shifting the financial risk from Medicare to the hospital (Vertrees et al., 2013).

CMS uses the area wage index, which considers regional variations in labor costs, to adjust the DRG rates paid to hospitals prospectively. The complex formula for adjusting hospital rates can provide substantial differences in payment for services provided by similar hospitals but located in different geographic locations (Dalton et al., 2002). This means hospitals located within a relatively short distance from each other can experience substantially different payments for the same DRG due to the significance the AWI plays in hospital reimbursement.

Much scrutiny has been placed on the AWI over the years due to the remarkable impact on the distribution of Medicare payments. Along with industry trade groups like the American Hospital Association (AHA), CMS has evaluated the AWI, and incremental changes have been made to address some concerns (Dalton et al., 2002). The OIG identified some significant issues in the AWI calculation process in a late 2018 report. CMS's authority to punish hospitals for false or inaccurate wage data was cited in the report and inaccuracies created by the rural floor (OIG, 2018). The AWI was intended to be utilized as a stable adjustment factor to account for regional variations in labor costs throughout the country; however, it remains controversial due to its consequential effect on hospital payments from year to year (Roth & Zimmerman, 2009). The Journal of Accountable Care Organizations recently published data associated with a study of MSSP ACOs and their effect on Medicare Claims. The study found that over 20% of the nation's surgeons now participate in ACOs. Patients moving from only primary care practices to multispecialty practices have reduced hospitalizations and accounted for a 28% drop in spending (Encinosa, 2020). Spending reductions associated with reduced hospitalizations

further the argument that gaining knowledge to decrease cost is a significant issue for MSSP ACOs.

Theory and Conceptual Framework

Knowledge Theory

As previously mentioned, ACOs are diverse organizations made up of a complex web of health care providers and health systems. A review of available literature does not reveal a common framework or theory to evaluate MSSP ACO behavior, likely due to ACOs' complexity and diversity. Several studies to date have utilized the previously mentioned three-cluster taxonomy developed by Shortell et al. in 2015 consisting of integrated delivery systems, smaller physician-led, and hybrid (Shortell et al., 2015). However, understanding how an organization gathers and utilizes data to develop processes and further its knowledge base may serve as a better lens to view and study the behavior of ACOs. This study used Knowledge-Based Theory (KBT) to help understand how the ACO can utilize internal and external data to develop a broader knowledge base to improve outcomes and achieve higher cost savings and quality scores.

KBT posits that firms develop structure and process to efficiently disseminate information within the organization through an organized fashion allowing it to capitalize on obtained knowledge (Miles, 2012). Firms that seek to increase human capabilities and organizational learning are more successful in empowering people to use the acquired knowledge and initiate changes that improve the organization (Yukl, 2002). Scholars who have advanced KBT have developed knowledge distinctions such as tacit knowledge (knowing how) and explicit knowledge (knowing about). Firms that can transfer the

tactic knowledge to other individuals and combine it with explicit knowledge have greater capacity and capabilities (Grant, 1996). KBT assumes that problem-solving forms knowledge and increases the organization's ability to perform at a high level (Nickerson & Zenger, 2004). Firms accumulate knowledge which drives how they organize and provides them with a competitive advantage over firms that have not accumulated knowledge at the same level (Miles, 2012).

A review of the relevant empirical literature on KBT suggests the theory is not a stranger to health care. Clinicians and researchers have worked for years to transfer tactic knowledge into guidelines for the care of patients and improve decision making. Health care organizations have historically been slow in embracing change. Information availability has not been matched with advances in information distribution (Kitson et al., 2012).

Knowledge absorption or knowledge to action was studied in Montreal, Canada, by researchers developing evidence-based guidelines for spinal cord injuries (Berube et al., 2015). These researchers determined that online education materials coupled with policies and procedures enhanced the adoption of guidelines and improved patient outcomes. Researchers Wang and Byrd (2017) examined business analytics for hospitals in Taiwan to see how decision-making was affected and mediated by knowledge absorption. Their research supported that effective use of data analysis influenced the effectiveness of decision making. Through the effective use and interpretation of knowledge absorption impacted decision-making for the institutions in the study (Wang & Byrd, 2017). Since healthcare providers must make substantial investments in infrastructure, effective use of the information within the organization seems vital.

ACOs are designed to be entities of integrated providers collectively held accountable for reducing the spending rate for their attributed population while also achieving higher quality metrics (Burke, 2011). These providers must have a baseline knowledge level of care delivery and cost containment and can use data from within and outside the organization to be effective. Researchers Kash and colleagues (2013) studied healthcare administrators' strategic initiatives experiences. This research confirmed that base knowledge must exist if organizations implement multiple initiatives simultaneously. The research also found that using qualitative analysis guidelines measuring an organization's ability to develop and disseminate knowledge can help determine its ability to implement change (Kash et al., 2013).

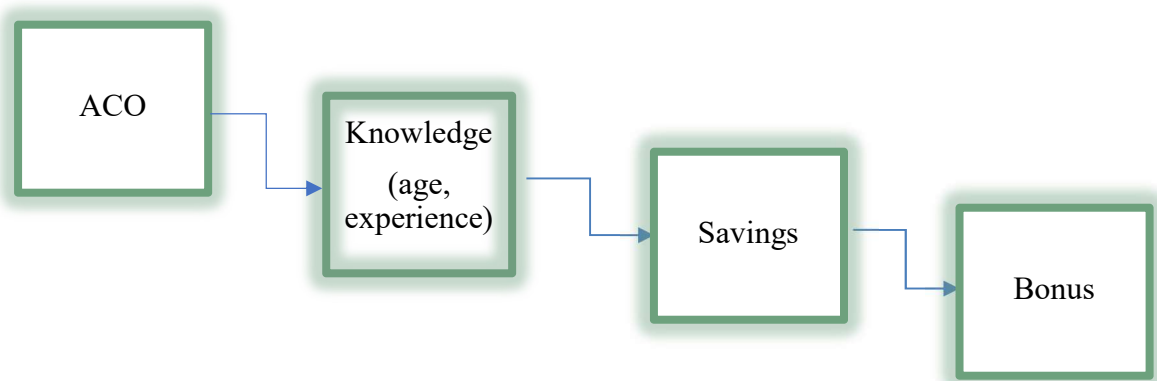
ACO researchers Lewis et al. (2018) found after a review of data collected in the National Survey of Accountable Care Organizations that many ACOs (37%) had obtained a management partner to provide knowledge and operational expertise. The researchers concluded these partners were a central piece of the operations and success of smaller physician-run ACOs, confirming another tenet of the theory that organizations must increase knowledge, which may be introduced into the organization from the outside. Some have suggested that the age of the ACO allows the organization to build upon the existing knowledge base and improve on previous cost and quality targets. As KBT suggests, organizations can build knowledge over the years and combine it with additional knowledge obtained from external sources to become more effective. Highly successful entities demonstrate the capacity to use accumulated knowledge, engage with external stakeholders, identify and execute strategic priorities, and focus on learning and development (Harvey et al., 2015). Effective use of information and research such as this

study can improve ACO performance and potentially provide higher performance and achievement.

Figure 4 is a conceptual framework demonstrating how the two hypotheses in this research integrate with KBT. The key variables hypothesized to be impacted by KBT are *Gross Savings* and *Achieved Bonus*. These variables represent the ACO's gross savings and the bonus achieved (if any), respectively. The intent is to see if gross savings and bonuses are impacted by the length of time in the program. In theory, the ACO's additional participation time should allow for the further accumulation of knowledge needed to be more effective in the program. One could argue that the ACO would have time to form effective processes and improve data harvesting and dissemination, thus, improving care delivery and cost containment.

Figure 4

Conceptual Framework



CHAPTER 3

RESEARCH METHODS

This chapter describes the methods to evaluate the relationship between the length of participation time in MSSP and the association of time on an ACO's gross savings and bonus. This section will outline the data used for the study and describe the research design, methods, and variables.

Study Design and Data Sources

This study was a cross-sectional study using Fiscal Year (FY) 2018 data from the Shared Savings Program Accountable Care Organizations (ACO) Public Use File (PUF) located on the CMS website. As described earlier, MSSP Track 1 phased out at the end of 2018, making way for Pathways to Success in 2019 (Perez, 2019). Consequently, 2018 is the last year to evaluate Track 1 ACOs and is the year the organizations were the most mature. Track 1 participants represented the majority of the ACOs (n=453) in the MSSP, with the total number of participating ACOs in all tracks being 546. The unit of analysis considered in this study was the MSSP ACOs.

Data Collection

Data were obtained from the publicly available source previously mentioned. Specifically, the following data variables were used from the ACO Public Use File:

- Track/contract the ACO has with CMS
- Initial Start Date (age of the ACO)
- Generated Savings or Loss
- Earned Savings or Loss
- Total assigned beneficiaries
- ACO achieved a shared saving bonus
- Number of Primary Care Physicians
- Number of Specialists
- Number of Hospitals
- Number of FQHCs
- Number of Hospital Admissions

Additionally, the two prior performance years (2016 and 2017) were reviewed. Earned Savings or Loss from those years were appended to the 2018 data set for secondary analysis.

Data Analysis

Application of Knowledge-Based Theory suggests MSSP ACO participants gain knowledge with experience (time in the program). This additional knowledge gained may improve their financial performance and increase bonus attainment. This study examined ACO outcome data to determine if participation time in the program influenced performance. The variables used in this study are contained in Table 1 below and are all from the CMS MSSP ACO Public Use File.

Table 1*Variables-listing of Variables and Descriptions*

Variable	Column Label	Description	Type
Dependent Variables			
Achieved Bonus	Achieved_Bonus	1 if earned bonus; 0 if no bonus	Binary
Gross Savings	GenSaveLoss	Amount of gross savings achieved by ACO	Continuous
Independent Variable			
ACO Age	ACO_Age	Length of Time in years the ACO has participated in MSSP	Continuous
Control Variables			
Number of Beneficiaries	N_AB_Year_PY	Total number of assigned beneficiaries in the ACO	Continuous
Number of PCPs	N_PCP	Number of PCPs in the ACO	Continuous
Number of Specialists	N_Spec	Number of specialists in the ACO	Continuous
Number of Hospitals	N_Hosp	Number of inpatient hospitals in the ACO	Continuous
Admissions	ADM	Number of inpatient admissions for the assigned beneficiaries	Continuous
Number of FQHCs	N_FQHC	Total number of FQHCs participating in the ACO	Continuous

Specifically, this study considered the following research questions and hypotheses:

Research Question 1: *Does length of participation time in MSSP produce a positive contribution to savings?*

Hypothesis 1 (H₁): *ACOs will report an increase in savings for each additional year of participation in the MSSP.*

Research Question 2: *Is there an association between ACO maturity and achieved Medicare shared savings bonuses?*

Hypothesis 2 (H₂): *ACOs achieving a shared saving bonus will reflect a greater mean age compared to ACOs not achieving bonus.*

The directionality of the hypotheses is consistent with Knowledge-Based Theory. ACOs with more participation time in the program are anticipated to achieve bonuses more often than ACOs with less participation time. Experience in the program is expected to contribute to success in gross savings and earning shared savings bonuses.

Dependent Variables

The evaluation included two different dependent variables: Generates Savings or Loss and Achieved Bonus. Generate Savings or Loss reflects the amount that health care spending is below or above the benchmark for the attributed beneficiaries in each ACO participating in MSSP. For H₁, Generate Savings or Loss was used in conjunction with the independent variable and control variables. This variable may reflect a positive amount if medical costs were less than the benchmark, a negative amount if costs exceeded the benchmark, and “0” if costs equaled the benchmark. Achieving health spending below benchmark does not qualify an ACO for a bonus as a minimum savings amount referred to the MSR must be met. MSR can vary based on the number of beneficiaries attributed to the ACO (CMS, 2012). Hypothesis 1 utilized Generate Savings or Loss to determine if participation time influenced the gross savings amount.

Achieved Bonus is a dummy variable created from a data field in the file name “EarnSaveLoss” which contains the amount of bonus earned by each ACO. The ACO must have exceeded the MSR for a bonus amount to be populated. Track 1 ACOs do not take risk, meaning they can either fail to meet MSR and receive no bonus or exceed the MSR and receive a bonus. The variable Achieved Bonus reflected “1” if the ACO achieved bonus or “0” if no bonus was achieved and was utilized to evaluate Hypothesis 2.

Independent Variable

The primary variable of interest is ACO Age. This variable was utilized in examining H₁ and H₂. ACO Age is a dummy continuous variable created by subtracting the ACO’s initial start date in MSSP from the performance year.

Control Variables

Evaluation of H₁ and H₂ was accomplished by using six control variables. These variables provided some level of insight into the characteristics of each ACO.

Number of Beneficiaries: This variable furnishes the number of Medicare beneficiaries assigned to each ACO. As mentioned previously, beneficiaries are assigned to an ACO by CMS based on their past claims history. Beneficiaries with less than 12 months of Medicare eligibility were excluded, and the total number of beneficiaries was divided by 12 months (CMS 2021b).

Admissions: This variable reflects the number of inpatient hospital discharges and is reported as a per 1,000 person-years number commonly referred to as *per 1000*.

Literature indicates part of the savings for an ACO comes from avoiding unnecessary admissions and readmissions (Bobbitt, 2014). The number of admissions for an ACO can be a performance metric on how effective the organization is at minimizing avoidable inpatient admissions. Since an admission's cost can vary depending on the patient's severity of illness and the treating facility type, strategic use of CMS cost data may allow the ACO to be more selective regarding the hospitals contracted to be in the organization's network. Since inpatient admissions are accounted for in the ACO's performance outcomes, including admissions to non-contracted facilities, minimizing costly inpatient admissions at all facilities is essential for an ACO to succeed.

The remaining control variables, Number of PCPs, Number of Specialists, Number of Hospitals, and Number of FQHCs, reflect health care providers who executed contracts to participate in each ACO. These variables furnish insight into the size and scope of the ACO.

Analytical Strategy

To examine H_1 , a regression analysis was used to determine if ACO age influenced gross savings. Examination of H_2 utilized a t-test to compare the mean age of the ACOs that achieved bonuses and those not achieving bonus. Alpha was set at .05, which means there was a 5% risk of concluding that a difference exists when there is no actual difference. H_2 would be supported with a p-value less than .05.

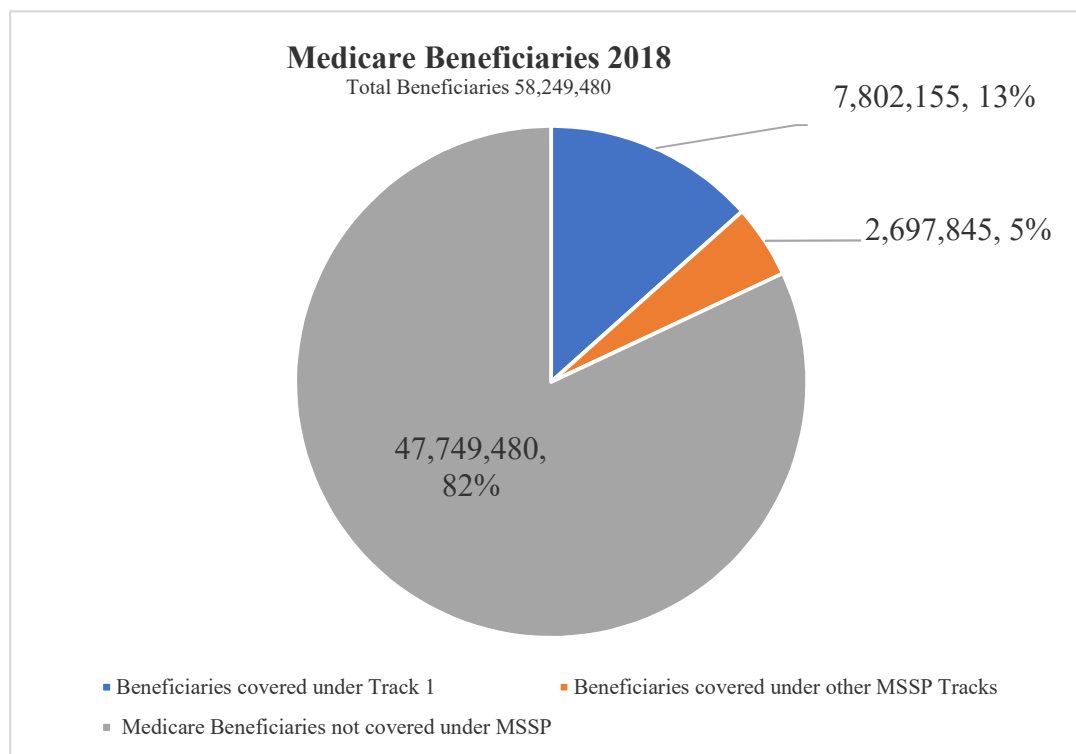
To further evaluate H_2 , logistic regression was utilized since the dependent variable of achieved bonus is categorical. The logistic regression is used to test the hypothesis by assessing the association between ACO Age and Achieved bonuses.

Logistic regression allows for estimating the log odds of an event occurring. For example, the odds of achieving a bonus can be determined for each additional year of participation of the ACO in the MSSP.

CHAPTER 4

RESULTS

The data analysis conducted on the study hypotheses are discussed in this chapter. All statistical analyses were completed using STATA/SE 17.0. The study utilized data from CMS and the public files available on accountable care organizations and their performance in the Medicare Shared Saving Program. Primarily, data from the 2018 performance year was analyzed. The total number of beneficiaries covered under Medicare in 2018 was 58,249,480 (KFF, 2018). MSSP ACOs accounted for approximately 10.5 million covered beneficiaries. Track 1 MSSP ACOs had beneficiaries totaling 7.8 million. Figure 5 below provides information regarding the beneficiary segmentation in 2018. Total Medicare spending in 2018 was \$750.2 billion (CMS, 2019

Figure 5*Medicare Beneficiaries 2018*

The MSSP ACO 2018 performance year file contained 561 records. However, once the data set was reduced to only Track 1 ACOs, the data contained 452 records or 81% of the total ACOs. Descriptive statistics for Track 1 data can be found in Table 2.

Table 2*Descriptive Statistics*

	Achieved Bonus mean ± (SD)	Did Not Achieve Bonus mean ± (SD)
N	146	306
Generate Savings or Loss	11,100,000 (1,040,257.00)	-1,579,493.00 (256,961.90)
Number of Beneficiaries	18,447.68 (1,733.12)	16,695.40 (902.92)
ACO Age	2.85 (.14)	2.03 (.10)
Number of PCPs	251.03 (31.11)	224.94 (14.71)
Number of Specialists	385.87 (60.96)	398.57 (30.14)
Number of Hospitals	1.46 (.25)	1.93 (.16)
Number of FQHCs	5.71 (1.74)	4.61 (1)
Admissions	306.58 (6.22)	319.61 (3.57)

SD= Standard Deviation, N= Sample Size

All 146 ACOs in Track 1 that achieved savings also achieved the minimum savings rate and qualified for some level of bonus. The bonus-achieving ACOs had savings of greater than \$1.6 billion in the performance year 2018. There were a total of 306 ACOs who did not achieve a bonus. Benchmark costs targets were matched on 247

of the 306 and produced no savings, while the other 59 generated costs over their benchmark. The increased costs associated with the 59 ACOs reduced overall Track 1 savings for CMS to \$1.1 billion.

The average age of ACOs achieving bonus was higher at 2.85 years compared to 2.03 years for those not achieving bonus. This age difference equates to approximately 10 months. Bonus-achieving ACOs had a higher average number of beneficiaries and participating primary care physicians while reporting a lower average number of participating specialists and hospitals. Bonus-achieving ACOs also reflected a lower total number of inpatient hospital discharges. This confirms previous information regarding the cost containment opportunities ACOs have by reducing hospitalizations.

Hypothesis 1

Hypothesis 1: ACOs will report an increase in gross savings for each additional year of participation in the MSSP.

The results of the multiple regression analysis conducted are presented below in Table 3. As expected, each additional year of ACO age produced an average of \$684,249.90 of gross savings ($p = 0.007$). Thus, Hypothesis 1 was supported.

The Number of Beneficiaries was found to be significantly associated with gross savings ($p < 0.001$) with each additional beneficiary producing average savings of \$192.14. Number of primary care physicians reflected marginal significance ($p = .059$) and was associated with savings of \$8,705.40 for each additional PCP. Participating hospitals were significant at the .05 level and reflected an average savings loss of \$397,950.90 for each additional participating hospital in the ACO. Similarly, number of specialists was associated with reduced savings with each additional specialist reducing savings by \$4,197.67 ($p = .03$).

The association between gross savings and all other variables tested was not found to be statistically significant .05 level

Table 3

Regression Model Output for Hypothesis 1

	Coefficient	Standard Error	95% Confidence Interval	
ACO Age	684,249.90**	251,722.90	189,533.60	1,178,966.00
Number of Beneficiaries	192.14***	38.66	116.16	268.13
Number of Hospitals	-397950.90*	194561.30	-780,326.40	-15575.45
Number of PCPs	8705.4	4602.01	-339.03	17749.83
Number of Specialists	-4197.67*	1958.20	-8,046.15	-349.18
Number of FQHCs	-10214.66	24674.94	-58,708.84	38,279.52
Admissions	59.44	6720.86	-13,149.22	13,268.10
Constant	-1998619	2334584	-6,586,826.00	2,589,588.00

p-value less than 0.05 (*), p-value is less than 0.01 (**), p-value is less than 0.001 (***)

Hypothesis 2

Hypothesis 2: *ACOs achieving shared saving bonus will reflect a greater mean age compared to ACOs not achieving bonus.*

The results of the t-test reported below in Table 4 was performed to compare ACO Age between ACOs that achieved bonus and ACOs that did not achieve bonus. There was a significant difference in ACO Age between ACOs that achieved bonus (M = 2.85, SD = 1.75) and ACOs that did not achieve bonus (M = 2.03, SD = 1.79); achieving ACOs reflected a mean age of 2.85 years (34 months, 5 days) compared to ACOs not achieving bonus at 2.03 years (24 months, 7 days). This equates to approximately 10 months of greater average participation time in MSSP for bonus achieving ACOs.

Table 4

T-test Output for Hypothesis 2

	Mean	N	Standard Deviation	Standard Error
Achieved Bonus	2.85	146	1.747283	.1446062
Did Not Achieve Bonus	2.03	306	1.788627	.102249
Difference = Mu Achieved Bonus - Mu Did Not Achieve Bonus Estimate for difference: 0.8179604 95% CI for difference: (0.4670077, 1.168913) T-Test of difference = 0 (vs not =): T-Value = 4.5804 P-Value = 0.0000 DF = 450 Both use pooled StDev = 1.814311				

A logistic regression analysis was performed to investigate the relationship between bonus achievement and specific control variables. Table 5 presents the results of this analysis. The ACOs had 1.24 ($p < 0.000$) times the odds of achieving bonus for each additional year of participation/age. This finding coupled with the t-test result provides support for Hypothesis 2.

Additionally, number of primary care physicians was found to have a statistically significant positive influence on bonus achievement with 1.002 ($p = 0.0480$) times the odds of achieving bonus for each additional PCP. Number of specialists was found to have a negative influence on bonus achievement. Each additional specialist represented .9989 times the odds of achieving bonus ($p = .05$).

Table 5

Logistic Regression Model for Hypothesis 2

	Odds Ratio	Coefficient	95% Confidence Interval [Odds Ratio]	
ACO Age	1.238375***	.2138	1.102202	1.391372
Number of Beneficiaries	1.000003	.0000118	.9999855	1.000021
Number of Hospitals	.9027699	-.0824703	.8108578	1.0051
Number of PCPs	1.002318*	.0023149	1.000024	1.004617
Number of Specialists	.9989853*	-.0001172	.9979727	.9999989
Number of FQHCs	.999651	2593.834	.9886205	1.010805
Admissions	.9972102	814.73	.9939119	1.000519
Constant	.6539278	-2438530	.2134387	2.003487

p-value less than 0.05 (*), p-value is less than 0.01 (**), p-value is less than 0.001 (***)

In conclusion, both hypotheses were supported reflecting participation time in the program has a statistically significant relationship with savings and bonus. As such, KBT aligns squarely with these findings as knowledge is considered one of the most valuable resources for an organization (Miles, 2012).

CHAPTER 5

DISCUSSION

The purpose of this chapter is to discuss the study results, limitations, and opportunities for future research. Implications of the findings will be discussed along with how healthcare leaders can use the study. The aim of the study was to determine the influence of participation time on both an ACO's ability to achieve gross savings and ability to achieve bonus. Implications of the findings for ACO leaders and policymakers will be discussed. Finally, the chapter will discuss the study's limitations and put forth areas for future research.

The two primary research questions addressed in the study were:

1. Does length of participation time in MSSP produce a positive contribution to savings?
2. Is there an association between ACO maturity and achieved Medicare shared savings bonuses?

The analyses conducted in this study indicate a relationship between both gross savings and bonus achievement with participation time.

Interpretation of Findings

The study found a significant relationship between participation time and gross savings ($\beta=772352.80$, $p= .002$). This finding furthers early research by Ouayogode et al. (2017). This research of 2012 performance year data, identified an increased likelihood of

savings for ACOs with prior experience in risk-bearing contracts (Ouayogode et al., 2017). Research in the early study was limited to factors associated with ACOs and did not have the ability to evaluate participation time since the study utilized data from the initial year of the MSSP.

Hospitals and specialists had a negative relationship with gross savings thus suggesting these providers impede savings. Literature suggests that ACOs benefit from referring patients to more cost-effective treatment providers such as surgery centers and outpatient centers (McWilliams et al., 2017). Since CMS does not specify ACO provider network requirements, ACOs have substantial flexibility regarding inclusion of hospitals and specialists in the organization (Leighton et al., 2019). Data provided to the ACO from CMS regarding the costs of the beneficiaries may provide the ACO the ability to strategically select providers who are more efficient in the delivery of care. The data in this study reflects a lower number of hospitals and specialists in the ACOs who achieve shared savings bonus suggesting that selective contracting for organization participants may exist. This current research, utilizing Knowledge-Based Theory, bolsters the argument made by the previous researchers regarding the influence that knowledge and experience has on achieving savings in the program.

The second research question in the study sought to determine if participation time had an influence on bonus achievement. ACO Age/participation time was found to have a statistically significant relationship with bonus achievement as there was 1.24 ($p < 0.000$) times the odds of achieving bonus for each additional year of participation/age.

This finding is akin to results seen in Hypothesis 1 and seems similarly supported under the theory utilized in the study.

The number of PCPs was found to have at least a marginal statistically significant positive influence on achievement of gross savings and bonus. Literature supports the positive association with shared savings with primary care physicians, and the negative association with specialists (McWilliams et al., 2016).

Past research suggests successful ACOs implement the following to achieve shared savings and bonuses:

- Identify disease categories that have high expense and implement actions that help mitigate the claims cost
- become proficient in care management
- reduce duplicative services
- eliminate or reduce avoidable expensive hospital admissions (Blackstone & Fuhr, 2016).

Assuming the benchmarks set by CMS for the ACO's population is favorable, ACOs who effectively implement the above items may be more likely to lower costs below the MSR and achieve a bonus. Achievement of bonus can offset expenses associated with ACO operations, and in some case, provide significant profit. The study data shows bonuses for performance year 2018 ranged from \$753K to \$50 million and averaged approximately \$5 million.

A secondary analysis of the ACOs participating in performance year 2018 was conducted by appending data from performance years 2016 and 2017 to the 2018 file. CMS changed the ACO ID numbers in 2018 therefore an ID crosswalk was utilized.

Specifically, earned bonus amounts if any were added from the previous years to the 2018 data set allowing for specific analyses to look for trends in performance.

ACOs that achieved bonus in performance year 2018 totaled 146. Of those, 17 (12%) achieved bonus in their first year of participation in MSSP. Literature reflects that some ACOs engage a management partner to provide knowledge and operational expertise (Lewis et al., 2018). While the data set does not reflect the utilization of management entities, this explanation seems likely.

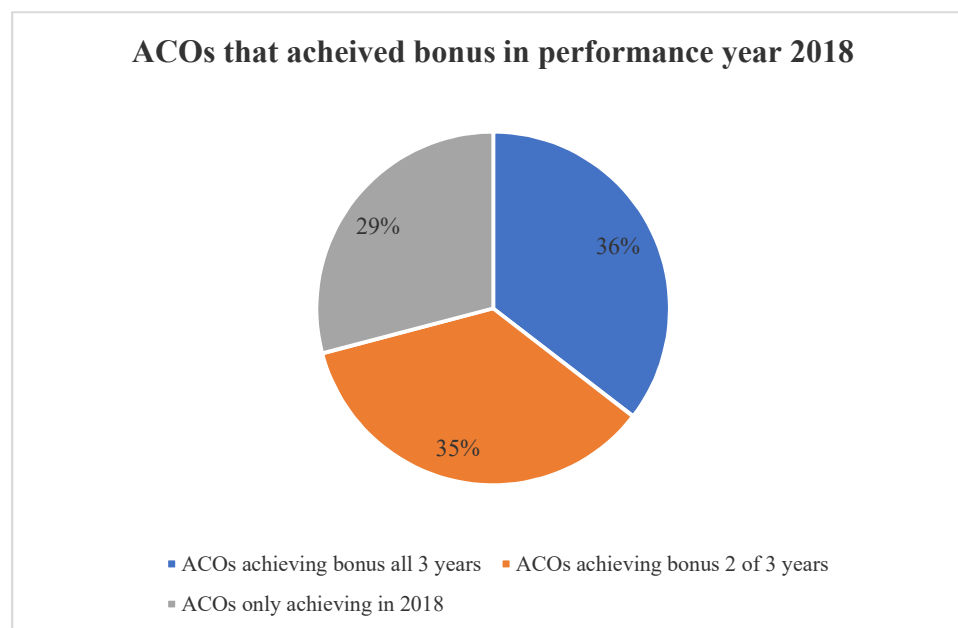
Bonus achieving ACOs in 2018 with participation in 2016 and 2017 had the following results over the period:

- 39 ACOs achieved bonus in all three years (2016, 2017, 2018)
- 39 ACOs missed bonus achievement in only one of the previous two years
- 32 did not achieve bonus in either 2016 or 2017

Figure 6 below provides a visualization of the bonus outcomes listed above.

Figure 6

Data on Previous Year's Performance for ACOs Achieving Bonus in the Performance Year 2018



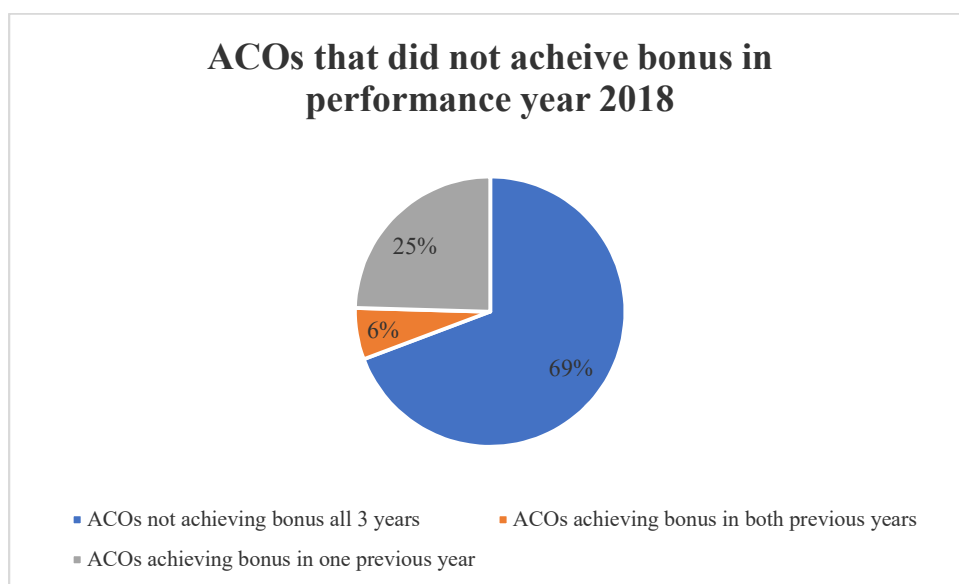
ACOs that failed to achieve a bonus in the performance year 2018 with participation in 2016 and 2017 had the following results over the period:

- 124 ACOs were unable to achieve a bonus in all three years (2016, 2017, 2018)
- 44 ACOs achieved bonus in one of the previous two years
- 11 ACOs achieved bonus during both last years (2016 and 2017)

Figure 7 below provides a visualization of the bonus outcomes listed above.

Figure 7

Data on Previous Year's Performance for ACOs Not Achieving Bonus in the Performance Year 2018



Study Limitations

The primary limitation of the study is the data set. Service area is reported only with the state(s) an individual ACOs operated in for 2018. Several ACOs operate in multiple states and the data elements inside the MSSP ACO PUF are summarized at the ACO level and not broken down by state or county. The approach used to evaluate the

data is appropriate. However, having more detailed service area information would have allowed more geographic and demographic data to be introduced into the study.

The ACOs included in this study's population had MSSP start dates from 2012 to 2018. While not assessed, some unsuccessful ACOs may have exited MSSP, suggesting potential survivorship bias in the study's population. However, discussions with industry leaders regarding this topic suggested that integration with community providers and no downside risk in Track 1 as the main arguments that survivorship bias was probably minimal or nonexistent. These industry leaders assert that most ACOs are formed by larger health care systems with significant resources to financially support the start-up of an ACO and its initial viability. After the initial capital outlay for the ACO's operating systems and staff, additional benefits to the capitalizing organization may be realized, such as, positive news media coverage regarding the ACO formation. A long-term benefit would be integrating the ACO providers outside the health system allowing for value-based contracts with other managed care organizations. In other words, providers deliver medical treatment similarly to all patient populations, and since the ACO's structure and processes are designed to reduce unnecessary utilization, commercial managed care companies are increasingly contracting with ACOs, and sharing savings dollars with the ACO (Gruessner, 2016).

Additionally, throughout the lifespan of the MSSP, CMS has annually adjusted or changed the program. Operational aspects such as benchmark-setting and track requirements have adjusted over the period. For example, CMS ended Track 1 after 2018 and introduced new formulas for calculating the benchmark. Changes such as these may limit the applicability of the study findings.

Implications

The findings in this study should encourage ACO leaders who are already participating in the MSSP, or those considering participation, to allow time for success. While the study showed 17 ACOs achieved shared savings bonuses in their first year of participation, the mean age of those achieving bonus was just shy of three years. Under Track 1, participants agreed to a three-year contract with CMS. As previously mentioned, some ACOs would complete the entire agreement term without achieving savings or bonuses. Recently, CMS changed the basic and enhanced track models to a five-year contract. ACO leaders now must assess if the organization can sustain operations for five years without shared savings in at least part of the years of participation.

ACOs must have specific infrastructures such as care management and quality reporting, which have an operating expense. Medicare's fee-for-service reimbursement often does not adequately compensate the providers for care provided (Newhouse, 2005). While CMS has offered various incentives to help ACOs with implementation costs, maintaining the infrastructure to remain compliant with MSSP ACO requirements can be costly. As discussed previously, the startup costs of forming an ACO can range between \$1 million and \$4 million (Terry, 2012). Ongoing operational costs coupled with high startup costs for the ACO must be adequately planned for by ACO leadership. This research should benefit ACO leaders by quantifying maturation time for the bonus.

Future Research

This study primarily looked at participation time in the program and the influence on savings and bonuses for the performance year 2018. The limitations listed above reveal opportunities for future research. The bulk of the study on ACOs has been conducted in the initial years of the MSSP program.

Future research could look at the influence of participation time on savings and bonuses for ACOs who participate in the newer essential and enhanced tracks. Changes under the Pathways to Success program for ACOs participating in performance year 2019 and beyond have increased the number of ACOs achieving ACOs.

Additionally, Knowledge-Based Theory would be a proximal theory to examine the role management organizations such as Premiere, Evolent, Caravan Health, and others have in accelerating savings and bonuses. As mentioned previously, management organizations may be an explanation for ACOs achieving savings bonuses in their first year of participation.

Some have suggested that an ACO's service area may impact savings and bonus achievement. Rural ACOs may have a different opportunity for success than ACOs that operate in more urban areas. Similarly, ACOs operating in higher wage index areas may have more significant opportunities for success than ACOs operating in lower wage index areas. As previously mentioned, many ACOs in the 2018 data set operated in multiple states. Therefore, these suggested research opportunities will likely become more challenging to study as ACOs grow and expand. Finally, four control variables had significance in one or both analyses. These variables may deserve more study to determine their contribution to ACO savings and/or bonuses.

Conclusion

The number of ACOs participating in MSSP continues to grow. The high failure rate of ACOs in achieving bonuses calls into question the sustainability of MSSP. These organizations have demonstrated an ability to achieve high-quality targets. However, bonus achievement remains elusive for most. As a reward for providing CMS with meaningful savings in 2018, bonus amounts were distributed to the 146 successful Track 1 ACOs totaling \$724.8 million. The 146 successful ACOs represented less than one-third of the Track 1 ACOs. For participants who expect immediate success in the program, this study provides valuable insight into the time needed to gain data and operational processes to be successful.

Despite this research, future research is likely needed to determine if participation time has similar effects on savings and bonuses with more recent track models. Knowledge-Based Theory provides a lens by which these organizations can be viewed and studied. The findings in this research will allow for future studies to be conducted on specific functions of ACOs and how those functions improve over time. Understanding which functions need improvement and the time required to improve may help ensure the viability of the MSSP and ultimately lower costs for the entire Medicare program.

REFERENCES

- Antos, J. R., & Capretta, J.C. (2019). Treat ACOs and MA plans equally? By all means. <https://www.healthaffairs.org/doi/10.1377/hblog20191112.742234/full/#:~:text=Their%20analysis%20concludes%20that%20ACOs,type%20of%20managed%20care%20arrangements>
- Bell, A. (2011). PPACA: HHS tries to sweeten ACO program. *LifeHealthPro*. <https://login.ezproxy3.lhl.uab.edu/login?url=https://search.proquest.com/docview/1030938644?accountid=8240>
- Bérubé, M., Albert, M., Chauny, J. M., Contandriopoulos, D., DuSablón, A., Lacroix, S., Gagné, A., Laflamme, É., Boutin, N., Delisle, S., Pauzé, A. M., & MacThiong, J. M. (2015). Development of theory-based knowledge translation interventions to facilitate the implementation of evidence-based guidelines on the early management of adults with traumatic spinal cord injury. *Journal of Evaluation in Clinical Practice*, 21(6), 1157-1168. doi:10.1111/jep.12342
- Blackstone, E. A., & Fuhr, J. J. P. (2016). The economics of Medicare Accountable Care Organizations. *American Health & Drug Benefits*, 9(1), 11-19.
- Bobbitt, J. D. B., Jr. (2014). ACO insider: Hospital employment of physician-led ACO? *Family Practice News*, 44(12), 1.
- Burke, T. (2011). Accountable care organizations. *Public Health Reports* 126(6), 875-878
- Colla, C. H., Lewis, V. A., Shortell, S. M., & Fisher, E. S. (2014). First National Survey of ACOs finds that physicians are playing strong leadership and ownership roles. *Health Affairs*, 33(6), 964-971. <https://login.ezproxy3.lhl.uab.edu/login?url=https://search.proquest.com/docview/1534525232?accountid=8240>
- Centers for Medicare & Medicaid Services. (2011). Methodology for determining shared savings and losses under the Medicare Shared Savings Program. *CMS.gov*. <https://www.cms.gov/newsroom/fact-sheets/methodology-determining-shared-savings-and-losses-under-medicare-shared-savings-program>
- Centers for Medicare & Medicaid Services. (2015). Finalized changes to the Medicare Shared Savings Program regulations. (2015) *CMS.gov*. <https://www.cms.gov/newsroom/fact-sheets/finalized-changes-medicare-shared-savings-program-regulations>
- Centers for Medicare & Medicaid Services. (2019). CMS Office of the Actuary releases 2018 National Health Expenditures. *CMS.gov*. <https://www.cms.gov/newsroom/fact-sheets/finalized-changes-medicare-shared-savings-program-regulations>

- Centers for Medicare & Medicaid Services. (2021a). Accountable Care Organizations (ACO). *CMS.gov*. <https://www.cms.gov/Medicare/Medicare-Fee-for-Service-Payment/ACO>
- Centers for Medicare & Medicaid Services. (2021b). Performance Year Financial and Quality Results. *CMS.gov*. <https://data.cms.gov/medicare-shared-savings-program/performance-year-financial-and-quality-results>
- Centers for Medicare & Medicaid Services. (2021c). Beneficiary Claims Data API. *CMS.gov*. <https://bcda.cms.gov/>
- Centers for Medicare & Medicaid Services. (2021d). In the news. *CMS.gov*. <https://www.cms.gov/Medicare/Medicare-Fee-for-Service-Payment/sharesavingsprogram/news#2018>
- Centers for Medicare & Medicaid Services. (2021e). In the news. *CMS.gov*. <https://www.cms.gov/newsroom/fact-sheets/first-accountable-care-organizations-under-medicare-shared-savings-program>
- Centers for Medicare & Medicaid Services. (2021f). Physician Group Practice Transition Demonstration. *CMS.gov*. <https://innovation.cms.gov/innovation-models/physician-group-practice-transition>
- Centers for Medicare & Medicaid Services. (2021g). Pioneer ACO Model. *CMS.gov*. <https://innovation.cms.gov/innovation-models/pioneer-aco-model>
- Centers for Medicare & Medicaid Services. (2022a). National Health Expenditure Data. *CMS.gov*. <https://www.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/NationalHealthExpendData/NationalHealthAccountsHistorical>
- Centers for Medicare & Medicaid Services. (2022b). Shared Savings Program fast facts. *CMS.gov*. <https://www.cms.gov/Medicare/Medicare-Fee-for-Service-Payment/sharesavingsprogram/program-data>
- Centers for Medicare & Medicaid Services. (2022c). Application toolkit. *CMS.gov*. <https://www.cms.gov/Medicare/Medicare-Fee-for-Service-Payment/sharesavingsprogram/for-acos/application-toolkit>
- Cubanski, J., Neuman, T., & Freed, M. (2019). *The facts on Medicare spending and financing*. <https://www.kff.org/medicare/issue-brief/the-facts-on-medicare-spending-and-financing/>

- Dalton, K., Slifkin, R. T., & Howard, H. A. (2002). Rural Hospital Wages and the Area Wage Index. *Health Care Financing Review*, 24(1), 155.
<https://search.ebscohost.com/login.aspx?direct=true&db=f5h&AN=8769934&site=ehost-live>
- Daly, R. (2016). First 'Next Generation' ACOs launch. *Healthcare Financial Management*, 70(2), 11.
- Encinosa, W. (2020). Is it time for ACOs to start tackling the high costs of surgery? *The American Journal of Accountable Care*, 8(3). doi:10.37765/ajac.2020.88680
- Grant, R. M. (1996). Toward a Knowledge-Based Theory of the Firm. *Strategic Management Journal*, 17(S2), 109-122. doi:10.1002/smj.4250171110
- Gray, C., & Sheiko, S. (2016). Choosing the right performance management system for your ACO. *Physician Leadership Journal*, 3(5), 58-60.
- Gruessner, V. (2016). What Are the Benefits of Accountable Care Organizations?. *Health Payer Intelligence*. <https://healthpayerintelligence.com/features/benefits-of-accountable-care-organizations>
- Harvey, G., Jas, P., & Walshe, K. (2015). Analysing organisational context: Case studies on the contribution of absorptive capacity theory to understanding inter-organisational variation in performance improvement. *BMJ Quality & Safety*, 1, 48-55.
- Horrigan, B. J. (2015). HHS sets goals and timeline for shifting Medicare reimbursements from volume to value. *EXPLORE*, 11(3), 175-176.
doi:<https://doi.org/10.1016/j.explore.2015.02.010>
- Hush, T. (2018). How provider-led ACOs can generate long-term savings.. *Healthcare Financial Management*, 72(5), 78.
- Ilene, M. (2015). 'Next Generation' ACOs: How they differ from Pioneer, MSSP models. *FierceHealthcare*. <https://www.fiercehealthcare.com/healthcare/next-generation-acos-how-they-differ-from-pioneer-mssp-models>
- Kash, B. A., Spaulding, A., Gamm, L., & Johnson, C. E. (2013). Health care administrators' perspectives on the role of absorptive capacity for strategic change initiatives: a qualitative study. *Health Care Management Review*, 38(4), 339-348.
- KFF. (2018). Total number of Medicare beneficiaries.
<https://www.kff.org/medicare/state-indicator/total-medicare-beneficiaries/?currentTimeframe=2&sortModel=%7B%22colId%22:%22Location%22,%22sort%22:%22asc%22%7D#note-1>

- Kitson, A., Wiechula, R., Slamond, S. W., & Jordan, Z. (2012). *Knowledge translation in healthcare*. Lippincott Williams & Wilkins.
- Kogut, B., & Zander, U. (1992). Knowledge of the Firm, combinative capabilities, and the replication of technology. *Organization Science*, 3(3), 383-397. doi:10.12987/orsc.3.3.383
- LaPointe, J. (2019). Medicare Shared Savings Program ACOs saved \$739M in 2018. *RevCycle Intelligence*. <https://revcycleintelligence.com/news/medicare-shared-savings-program-acos-saved-739m-in-2018>
- Leighton, C., Cole, E., Everett, J., & Driessan, P. (2019). Medicare Shared Savings Program ACO Network Comprehensiveness and Patient Stability. *The Journal of Managed Care*, 25(9). <https://www.ajmc.com/view/medicare-shared-savings-program-aco-network-comprehensiveness-and-patient-panel-stability>
- Lewis, V., D'Aunno, T., Murray, G., Shortell, S., & Colla, C. (2018). The hidden roles that management partners play in Accountable Care Organizations. *Health Affairs*, 37(2), 292-298. doi:10.1377/hlthaff.2017.1025
- Marmor, T., & Oberlander, J. (2012). From HMOs to ACOs: The quest for the holy grail in U.S. health policy. *Journal of General Internal Medicine : JGIM*, 27(9), 1215-1218. doi:10.1007/s11606-012-2024-6
- McWilliams, J. M., Hatfield, L. A., Chernew, M. E., Landon, B. E., & Schwartz, A. L. (2016). Early performance of Accountable Care Organizations in Medicare. *New England Journal of Medicine*, 374(24), 2357-2366. doi:10.1056/NEJMsa1600142
- McWilliams, J. M., Chernew, M. E., & Landon, B. E. (2017). Medicare ACO Program savings not tied to preventable hospitalizations or concentrated among high-risk patients. *Health Affairs*, 36(12), 2085-2093. doi:10.1377/hlthaff.2017.0814
- Mechanic, R., & Gaus, C. (2018). Medicare Shared Savings Program produces substantial savings: New policies should promote ACO growth. <https://www.healthaffairs.org/doi/10.1377/hblog20180906.711463/full/#:~:text=ACOs%20must%20achieve%20a%20savings,save%20money%20receive%20bonuses%20payments>
- Miles, J. A. (2012). *Management and organization theory: A Jossey-Bass Reader* (1st ed.). Wiley.
- National Association of Accountable Care Organizations. (2016). ACO comparison chart. <https://www.naacos.com/assets/docs/news/revisedsummaryaco-comparisonchart.pdf>

- Nattinger, M. C., Mueller, K., Ullrich, F., & Zhu, X. (2018). Financial performance of rural Medicare ACOs. *Journal of Rural Health, 34*(1), 98-102. doi:10.1111/jrh.12205
- Newhouse, J. P. (2005). Medicare's challenges in paying providers. *Health Care Financing Review, 27*(2), 35-44.
- Nickerson, J. A., & Zenger, T. R. (2004). A Knowledge-Based Theory of the Firm: The problem-solving perspective. *Organization Science, 15*(6), 617-632. doi:10.1287/orsc.1040.0093
- Nonaka, I. (1994). A dynamic theory of organizational knowledge creation. *Organization Science, 5*(1), 14-37. doi:10.1287/orsc.5.1.14
- OIG. (2017). Medicare Shared Savings Program Accountable Care Organizations have shown potential for reducing spending and improving quality. *OEI-02-15-00450*. <https://oig.hhs.gov/oei/reports/oei-02-15-00450.asp>
- Ouayogodé, M. H., Colla, C. H., & Lewis, V. A. (2017). Determinants of success in Shared Savings Programs: An analysis of ACO and market characteristics. *Healthcare, 5*(1-2), 53-61. doi:10.1016/j.hjdsi.2016.08.002
- Perez, K. (2019). CMS overhauls the MSSP. *Healthcare Financial Management, 73*(4), 18-19.
- Roth, J. M., & Zimmerman, E. (2009). The coming storm Medicare wage index overhaul signals changes for hospitals. *Healthcare Financial Management, 63*(2), 34-37.
- Salhany, R., Carpenito, P., Conrad, S., & Eversley-Danso, J. (2018). Achieving ACO savings: A case study. *Healthcare Executive, 33*(5), 58-60.
- Scutchfield, F. D., Michener, J. L., & Thacker, S. B. (2012). Are we there yet? Seizing the moment to integrate medicine and public health. *American Journal of Public Health, 102 Suppl 3*(S3), S312-S316. doi:10.2105/AJPH.2012.300724
- Shortell, S., Colla, C., Lewis, V., Fisher, E., Kessell, E., & Ramsay, P. (2015). Accountable Care Organizations: The national landscape. *Journal of Health Politics, Policy and Law, 40*(4), 647-668. doi:10.1215/03616878-3149976
- Terry, K. (2012). For ACOs, IT startup costs top \$1 million. *Informationweek - Online*. <https://www.informationweek.com/clinical-information-systems/for-acos-it-startup-costs-top-1-million>
- Tikkanen, R., & Abrams, M. (2020). U.S. health care from a global perspective, 2019. *Medical Benefits, 37*(3), 6-9.

- Troy, T. (2015). *How the government as a payer shapes the health care marketplace*.
https://www.americanhealthpolicy.org/Content/documents/resources/Government_as_Payer_12012015.pdf
- Verma, S. (2020). 2019 Medicare Shared Savings Program ACO performance: Lower costs and promising results under 'Pathways To Success'.
<https://www.healthaffairs.org/doi/10.1377/hblog20200914.598838/full/>
- Vertrees, J. C., Averill, R. F., Eisenhandler, J., Quain, A., & Switalski, J. (2013). Bundling post-acute care services into MS-DRG payments. *Medicare & Medicaid Research Review*, 3(3), E1-E19. doi:10.5600/mmrr.003.03.a03
- Walker, T. (2015). ACO results released. *Managed Healthcare Executive*, 25(12), 15-16.
- Wang, Y., & Byrd, T. (2017). Business analytics-enabled decision-making effectiveness through knowledge absorptive capacity in health care. *Journal of Knowledge Management*, 21(3), 517-539. doi:10.1108/JKM-08-2015-0301
- Wilensky, G. R. (2011). Lessons from the Physician Group Practice Demonstration — A sobering reflection. *The New England Journal of Medicine*, 365(18), 1659-1661. doi:10.1056/NEJMp1110185
- Yukl, G. A. (2002). *Leadership in organizations* (5th ed.). Prentice Hall.

APPENDIX

UNIVERSITY OF ALABAMA AT BIRMINGHAM INSTITUTIONAL REVIEW
BOARD APPROVAL LETTER



Office of the Institutional Review Board for Human Use

470 Administration Building
701 20th Street South
Birmingham, AL 35294-0104
205.934.3789 | Fax 205.934.1301 |
irb@uab.edu

NHSR DETERMINATION

TO: Knight, Terry D

FROM: University of Alabama at Birmingham Institutional Review Board

Federalwide Assurance # FWA00005960

IORG Registration # IRB00000196 (IRB 01)

IORG Registration # IRB00000726 (IRB 02)

IORG Registration # IRB00012550 (IRB 03)

DATE: 26-Jan-2022

RE: IRB-300007896

Shared Savings Bonus in MSSP And Its Association With Length of Participation

The Office of the IRB has reviewed your Application for Not Human Subjects Research Designation for the above referenced project.

The reviewer has determined this project is not subject to FDA regulations and is not Human Subjects Research. Note that any changes to the project should be resubmitted to the Office of the IRB for determination.

if you have questions or concerns, please contact the Office of the IRB at 205-934-3789.