

AN EXAMINATION OF POTENTIAL MEDICAL GROUP PRACTICE
PARTICIPATION IN ACCOUNTABLE CARE ORGANIZATIONS

by

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DEDICATION

This dissertation is dedicated to my wonderful wife, Louise Gibson Porterfield Tucker Anderson. She supported me, encouraged me, and most importantly believed in me when I needed all of these. I simply could not have completed this journey without her beside me, and I am completely grateful for all she has done to help me achieve this goal.

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TABLE OF CONTENTS

	Page
List of Tables	vii
List of Abbreviations	viii
Abstract	ix
Chapter One: Introduction	1
Section One – Overview of the Affordable Care Act	3
Section Two – Accountable Care Organizations	4
Section Three – Contributions of this Research.....	13
Chapter Two: Organization of Medical Services in the US Healthcare System	15
Section One – Medical Group Practice in the Health Sector	17
Section Two – Development of Medical Group Practice Organizations	20
Chapter Three: Literature Review	28
Section One – Economic Theory and Medical Group Practice	28
Section Two – Organization Theory and Medical Group Practice	37
Chapter Four: Research Question and Hypotheses.....	45
Chapter Five: Quantitative Analysis	55
Section One – Description of Survey Data	56
Section Two – Description of Model	58
Subsection One – Analysis variables for Hypothesis 1	60
Subsection Two – Analysis variables for Hypothesis 2	62
Subsection Three – Analysis variables for Hypothesis 3	63
Subsection Four – Analysis variables for Hypothesis 4.....	66
Section Three – Description of Methods.....	68
Subsection One – Factor Analysis	68
Subsection Two – Variable recoding.....	79
Subsection Three – Logistic Regression Model	83
Chapter Six: Regression Analysis Findings.....	85

Section One – Model and Initial Results.....	85
Section Two – Logistic Regression Diagnostics.....	88
Section Three – Examination of Hypotheses	94
Section Four – Practice Type and Organization Type	107
Chapter Seven: Discussion and Implications.....	120
Section One – Limitations and Generalizability	120
Section Two – Policy Implications	129
Section Three – Directions for Future Research	138
Appendix: ACO Survey Instrument.....	141
References.....	154

LIST OF TABLES

Table	Page
Table 1 - Type of Organization for All Respondents	57
Table 2 - Group Size - FTE Physicians	58
Table 3- ACO status for medical practices	59
Table 4 - Independent Variables by Hypothesis	84
Table 5 - Descriptive Statistics	86
Table 6 - Logistic Regression Main Model	87
Table 7 - Linktest Model Specification Diagnostic	89
Table 8 - Goodness-of-Fit	90
Table 9 - Stepwise Logistic Regression Model	91
Table 10 - Measures of fit for logistic of Q21ACO	92
Table 11 - Classification Table for Q21ACO responses	94
Table 12 - Hypothesis 1 significant variables ($p > 0.10$)	95
Table 13 - Hypothesis 3 significant variables ($p > .10$)	102
Table 14 - Categorical variable Q25FTE	105
Table 15 - Analysis of ACO model by Practice Type	109
Table 16 - Analysis of ACO model by Organization Type	113
Table 17 - Analysis of ACO model for Cost & Production Survey Respondents	119
Table 18 - Distribution of Physicians by Practice Size	122
Table 19 - Comparison of ACO model to non-participants	126

LIST OF ABBREVIATIONS

ACO	Accountable Care Organization
AMA	American Medical Association
CI	Confidence Interval
CMS	Centers for Medicare and Medicaid Services
DGR	Diagnosis Related Groups
EHR	Electronic Health Records
FQHC	Federally Qualified Health Center
FTE	Full Time Equivalent
GAO	Government Accountability Office
HHS	Department of Health and Human Services
HMO	Health Maintenance Organization
HSA	Hospital Service Area
IDS	Integrated Delivery Systems
IPA	Independent Practice Association
MGMA	Medical Group Management Association
MSSP	Medicare Shared Savings Plan
NCQA	National Committee for Quality Assurance
PPACA	Patient Protection and Affordable Care Act
PHO	Physician Hospital Organization
PPBS	Physician Practice Benchmark Survey
PCMH	Patient Centered Medical Home
RBRVS	Resource Based Relative Value Study

ABSTRACT

AN EXAMINATION OF POTENTIAL MEDICAL GROUP PRACTICE PARTICIPATION IN ACCOUNTABLE CARE ORGANIZATIONS

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The Patient Protection and Affordable Care Act of 2010 included legislation to create a new organizational structure, the Accountable Care Organization (ACO). This attempt to achieve the “triple aim” to improve the experience of care, improve the health of populations, and reduce the per capita costs of care establishes ACOs as a mechanism to provide coordinated care focusing on quality and outcomes in place of outputs. Medical group practices will be the focus of ACO formation. This research examines factors which make medical groups more likely to participate in ACOs. Utilizing data from a survey of medical group practices on the evolving healthcare environment, a logistic regression model is developed that indicates significant predictors of medical group participation in ACO development. Organizational size, engagement in joint venture activities, experience in Patient Centered Medical Homes, and organizational structural elements including the ability to manage clinical information, track quality

measurements, and experience with payer incentive payments were all significantly associated with ACO participation. Organizational efficiency measures such as ability to track costs per episode of care were not found to be predictors of ACO participation. These results suggest an initial engagement in this new healthcare delivery model by medical groups with certain elements that align with a changed environment. Larger participation may be limited by the small size of most medical groups and the lack of internal resources to meet ACO requirements. Policy considerations to ease medical group participation in ACOs are reviewed. Future research is suggested to focus on the motivations and barriers to medical group practice participation in emerging organizational constructs for the delivery of healthcare services.

CHAPTER ONE: INTRODUCTION

The organization of medical care in the United States has been in change since the origins of America. While economic considerations shaped medical practice activity prior to the creation of the United States, it was the rise of differentiated social structure in the mid-nineteenth century that fostered the development of organized medicine as a distinct professional component of the American economy. Paul Starr notes that the period of 1850 through 1930 witnessed the consolidation of professional authority among physicians, with the development of a profession that received both economic power and status deriving from the ability of physicians to take advantage of having America's greater "social interests defined so as to conform to their own" (Starr & American Council of Learned Societies, 1982).

As the profession of medicine has advanced in scope and complexity, numerous organizational forms have emerged as physicians have joined together as business entities. These collectivities include professional associations, medical groups, pre-paid medical practices, and independent practice associations to enumerate a few common examples. And as the issues of access, costs, and outcomes continue to be concerns of welfare economics in the health sector, there has been an increasing examination of the organized delivery of health services.

Prior iterations of health policy to address these issues through the organization of medical services are typified by the Health Maintenance Organization Act of 1973 (P.L. 93-222). This legislation mandated the offering of a federally-qualified HMO insurance option (where available) to employees in firms of twenty-five or more employees where traditional indemnity insurance benefits were offered. The HMO concept was an attempt to introduce managed competition into the health sector, defined as “a purchasing strategy to obtain maximum value for money for employers and consumers” (Alain C. Enthoven, 1993). It built upon and extended the model of pre-paid group practice, where a total premium was paid to a group of medical providers in return for accepting the responsibility and risk of providing health care for a specified population of patients, typically the employees and dependents of a large industrial organization. However, the HMO construct, with its “gatekeeper” model of directing care through a primary care physician and its failure to reduce the increases in national health expenditures, was not the panacea anticipated to meet health policy goals (A. C. Enthoven, 1993; Bodenheimer T, Lo B, & Casalino L, 1999). Issues of access, costs, and outcomes for substantial segments of American society remained unresolved, and the market retreated from tightly controlled managed care models to more consumer-friendly Preferred Provider Organizations. These PPOs allowed for broader access by patients across healthcare organizations, but did not significantly reduce the costs of care or create demonstrable changes in the outcomes of care provision. Health policy advocates continued to suggest new models of health care service provision, building on the strengths and limitations of managed care systems. The presidential election of 2008 provided a policy window for

implementing substantial change in the organization and delivery of health care services in the United States. A policy stream (Kingdon, 2003) incorporating constructs of systemic change, demonstration models of outcome and cost reduction-driven health care services provision, and an increased understanding of the social and economic costs of large numbers of uninsured all combined to result in the most sweeping health policy change since the introduction of Medicare in 1965.

Section One – Overview of the Affordable Care Act

On March 23, 2010 President Barack Obama signed Public Law 111-148, The Patient Protection and Affordable Care Act (PPACA) of 2010. This sweeping legislation signaled a substantial shift in the policy of providing access to affordable health care to all American citizens. The main focus of the legislation was a series of policy initiatives designed to provide insurance coverage to an estimated 30 million uninsured Americans, and strengthen the health care sector of the economy. The broad health policy initiative was a bold attempt to achieve what has been phrased the “triple aim” of health reform, namely “improving the experience of care, improving the health of populations, and reducing the per capita costs of care” (Berwick, Nolan, & Whittington, 2008).

Elements of this legislation that focused on quality and costs (as opposed to, but not necessarily detached from, the access or coverage concerns), were outlined in Section 3022 of the act. This section required the Centers for Medicare and Medicaid Services (CMS) to “establish a shared savings program to facilitate coordination and cooperation among providers to improve the quality of care for Medicare fee-for-service beneficiaries and reduce unnecessary costs” (Centers for Medicare & Medicaid Services, n.d.-b). The

program is designed to encourage hospitals, physicians, and other providers and health care suppliers to create accountable care organizations (ACOs). These ACOs will be incentivized to provide cost-effective, coordinated care to Medicare beneficiaries. The organizations will be held responsible to achieve improvements in the health outcomes of individuals, improve the overall health of populations, and simultaneously reduce the growth of health care expenditures. As noted on the Health.Gov website, the components of an ACO may comprise various elements, and can include ACO organizations of physicians and hospitals that meet statutory definition, networks of individual practices of ACO professionals, partnerships or joint ventures between hospitals and ACO professionals, hospitals employing ACO professionals, and other Medicare providers and suppliers as determined by the Secretary (ASPA, n.d.).

Section Two – Accountable Care Organizations

Accountable Care Organizations are a concept for the organizational delivery of health services that developed from concerns among health policy researchers regarding both the fragmentation of care through individual providers, and the wide geographic variation in costs to Medicare in the provision of services. Research into the issues of coordinated care and the associated costs of fragmentation were a response to the Institute of Medicine report on mechanisms to improve health care delivery (Institute of Medicine (U.S.), 2001). This IOM report called for increased accountability and integration of health care services provision. The report was reinforced by research from the Dartmouth Medical School that demonstrated substantial regional variation in the costs of medical care provided to Medicare beneficiaries without any demonstrable

difference in the quality or access to care that would account for these cost variations (Fisher et al., 2003a). The Dartmouth group also noted that although recipients in higher-spending regions received more care than those in lower-spending regions, they had neither better outcomes nor higher satisfaction with the care they received (Fisher et al., 2003b). While the studies were limited to Medicare spending on three clinical conditions (hip fractures, colorectal cancer, and acute myocardial infarctions), the results strongly suggested that different organization structures for the provision of medical services could potentially reduce these variations in costs without adversely affecting the quality of care provided, and the perceived patient satisfaction with that care.

Building on this research, health services researchers and health policy advocates explored new frameworks for health services delivery to address these concerns. Research into the performance of large medical groups found that organizational culture and external reporting requirements were key elements in creating better quality and cost performance results in the provision of medical services (Stephen M. Shortell et al., 2005). However, the health sector environment was more characterized by small single specialty groups or solo providers than by either large multispecialty group practices or integrated health maintenance organizations (HMOs) such as the Kaiser-Permanente systems. In examining the potential of large medical groups, researchers noted that “Survey data indicate that 47% of private physicians work in practices of 1 or 2 physicians and 82% in practices of 9 or fewer...” (Casalino, Devers, Lake, Reed, & Stoddard, 2003).

Based on the health services research evidence, the potential of medical group practices to provide efficient, high quality health services became an important policy initiative for CMS. CMS initiated the Medicare Physician Group Practice (PGP) Demonstration project, the first pay-for-performance program for physicians providing Medicare services. The PGP was designed to create "...incentives for physician groups to coordinate the overall care delivered to Medicare patients, rewarded them for improving the quality and cost efficiency of health care services, and created a framework to collaborate with providers to the advantage of Medicare beneficiaries" ("PGP_Fact_Sheet.pdf," 2011).

The Medicare PGP demonstration project was a five-year program designed to encourage coordination in the provision of Medicare Part A (primarily inpatient services) and Medicare Part B (primarily physician provider services); to use care management processes and process redesign to increase cost efficiency and effectiveness; and to provide financial incentives to physicians for improving health outcomes. Physician organizations participating in the program were paid the standard Medicare fee schedules, but would be eligible to receive performance payments of up to eighty percent (80%) of the savings they generated. This performance system included both cost efficiencies on per capita Medicare expenditures for assigned beneficiaries and a phased-in program of achieving quality performance benchmarks. Organizations were not only responsible for achieving per capita expenditures less than annual performance targets with a two percent (2 %) savings threshold, but also the organizations were required to meet the reporting requirements of thirty-two (32) quality performance

measurements that were phased in over the first three years of the demonstration project. These quality measurements were developed in conjunction with the American Medical Association's Physician Consortium for Performance Improvement and the National Committee for Quality Assurance (NCQA). The measures included items related to the treatment and control of diabetes mellitus, congestive heart failure, coronary artery disease, the provision preventive care services such as screening on blood pressures, breast cancer, and colorectal cancer.

Ten large well-established multispecialty physician group organizations participated in the Medicare PGP demonstration project. These groups ranged in size from two hundred thirty-two (232) physicians to over twelve hundred (1,291) physicians, and included various different organizational attributes (Levitt, 2006). Two were components of an academic medical center, two were freestanding for-profit entities, and three others had relationships with HMOs. By the end of year 5 of the demonstration project, all ten of the physician groups had achieved the required quality performance benchmarks on 30 of the 32 measures. However, only four physician groups (Marshfield Clinic, Park Nicollet Health Services, St. John's Health System, and the University of Michigan) earned incentive payments, and the majority of these payments were made to one organization, the Marshfield Clinic. (In year 4, the Marshfield Clinic earned \$16 million, over one-half of the \$31 million awarded in bonus to the participating groups). Two of the organizations (the Billings Clinic and Forsythe Medical Group) never earned incentive payments during the five years of the project, and only two groups (Marshfield

Clinic and the University of Michigan) earned incentive payments in each of the project demonstration years (“PGP_Fact_Sheet.pdf,” 2011).

Notwithstanding the mixed results of this demonstration project, the development of the Medicare ACO program was predicated on an expansion of the framework of this program (Iglehart, 2010). The Medicare Shared Savings Program (MSSP) was designed to create ACOs which would build on the experiences of the Medicare PGP project. As developed in Section 3022 of the Affordable Care Act, this program would encourage the creation of voluntary organizations of physicians, hospitals, and other health providers that would act in a coordinated fashion to provide high quality care to Medicare recipients. The purpose of the program was described by CMS as follows:

“The goal of coordinated care is to ensure that patients, especially the chronically ill, get the right care at the right time, while avoiding unnecessary duplication of services and preventing medical errors. When an ACO succeeds both in both delivering high-quality care and spending health care dollars more wisely, it will **share in the savings** it achieves for the Medicare program” (Centers for Medicare & Medicaid Services, n.d.) [Emphasis in the original]

The ACO initiative developed by CMS has three program components. The Pioneer ACO Model was created for early adopters of the ACO program where these organizations had previous experience in care coordination across multiple settings. The emphasis here is to move these organizations beyond simple shared savings activities into population-based risk management. The Medicare Shared Savings Program is the

primary mechanism for fee-for-service providers to participate in ACOs. It is designed to promote accountability in the care provided on a fee-for-service basis to Medicare recipients, requiring coordinated care for all services provided to these recipients, and encouraging the investment of these organizations in both infrastructure (such as health information technology) and the redesign of care processes. The third component of the ACO program is the Advance Payment Initiative. This program provides incentive to physicians and rural providers to develop ACO models through upfront and monthly payments to develop necessary organizational infrastructure and acquire staff for care coordination activities.

The initial proposed rules for the operation of the MSSP were met with strong objection by medical group practices. The proposed rules incorporated both risk and reward mechanisms for ACO participation, unlike the Medicare PGP demonstration project, which only shared savings that were achieved. Commenting on the proposed rules, a significant number of large provider organizations indicated that they would not participate in the ACO program, including all ten of the Medicare PGP demonstration project participants (Berenson, 2011). In response to this and other concerns regarding population determination, the number of quality measures required to be tracked, and infrastructure requirements including electronic health records, the final rule was modified. On October 20, 2011 the Department of Health and Human Services (HHS) issued the final rules, which modified the risk-bearing elements of participation in the ACO program, as well as reducing from 65 to 33 the number of quality measures that needed to be reported for participation.

Upon finalization of the revised rules for participation in the Medicare Shared Savings Program, multiple medical organizations began the application process to participate in the development of ACOs. As noted above, the Pioneer ACO Model program was designed to move organizations with experience in coordinated care from a shared savings model to a population-based risk bearing program, as well as creating a framework for these organizations to use the ACO model with private insurance carriers in addition to Medicare patients. In December 2011, HHS announced that thirty-two (32) organizations had successfully applied to begin as Pioneer ACO models in January, 2012, including three organizations (Dartmouth-Hitchcock Clinic, Park Nicollet Health Services, and University of Michigan) that had participated in the Medicare PGP demonstration (HHS Press Office, 2011).

In the spring of 2012, CMS announced that twenty-seven organizations had successfully applied to participate in the MSSP, effective April 1st. This was followed by the announcement in July, 2012 that an additional eighty-nine (89) organizations had successfully applied to participate in MSSP as ACOs beginning July 1st (“HHS announces 89 new Accountable Care Organizations,” 2012). Of the initial twenty-seven ACO organizations, five had qualified for participation in the Advanced Payment Model to provide upfront and immediate payments to facilitate organizational development. These ACOs were located in North Carolina, Kentucky, New Hampshire, Texas and Florida.

Given the strong reception to the MSSP, it would appear that the policy has been successfully implemented as a legislative initiative to alter the provision and

coordination of health care services, at least among the Medicare population. However, as Casalino notes, the over eighty percent of medical group practices in the United States are comprised of nine or less full-time practicing physicians (Casalino, Devers, Lake, et al., 2003). The Government Accountability Office (GAO), in assessing the potential of expanding on the Medicare PGP demonstration project, compared the size of the ten participant organizations to the universe of medical group practices. Reporting on data from the Medical Group Management Association, the GAO noted that 2005 surveys reported 83% of all group practices (N = 194,278) were comprised of 1 or 2 physicians. Moreover, only 1% of all practices (N = 2,149) had 25 or more physicians (King, Kathleen, 2008). A more recent analysis from the American Medical Association suggests that while sixty percent of physicians still practice in groups of 10 or fewer physicians, there is a trend of increasing group size (Kane & Emmons, 2013). Their Physician Practice Benchmark Study indicates a decrease in physicians in solo practice to approximately eighteen percent of active physicians, and a growth to over twelve percent of physicians practicing in groups of at least 50 physicians. These shifts in group size suggest that the environment for new organizational constructs, and mechanisms of compensating medical services, have responded to the types of financing mechanisms suggested by the ACO model.

It is also important to note that ACO constructs are not solely a model being introduced by CMS to improve quality and lower costs for Medicare beneficiaries. Commercial carriers have also been active in exploring the ACO model in contracting with hospitals and medical groups. The Engelberg Center for Health Care Reform has

partnered with the Dartmouth Institute for Health Policy and Clinical Practice since 2007 in the creation of The Brookings-Dartmouth ACO Learning Network. This organization serves as a member-driven network to foster the implementation of affordable care structures in non-Medicare patient populations. It provides information to its provider and insurer members regarding development, tools and best practices in emerging ACOs, and also reports on the growth of ACO models. This type of support has been instrumental in the development of commercial ACOs. Leavitt Partners reported that through the third quarter of 2013, almost as many non-Medicare ACO relationships (N=235) had been established between providers and commercial insurance carriers as had been established through CMS (N=253) (Peterson, Muhlestein, & Gardner, 2103).

Health policy researchers suggest that the growth of ACO models, both for Medicare beneficiaries and in the commercial insurance markets, will be spurred through changes in payment mechanism such as a revision in the Sustainable Growth Rate (SGR) (“Accountable Care Growth In 2014,” n.d.). This mechanism for determining increases for provider payments under Part B of Medicare is under increasing pressure to be revised into a system that moves away from exclusively rewarding volume-based payment of Medicare services. A significant component of any revision to this payment methodology incorporates payments based on value for services provided, and the ACO model is seen as a mechanism to move health care delivery away from volume-based incentives. Thus understanding the interest and ability of medical groups to engage in ACO models has significance not only as a response to Section 3022 of the Affordable

Care Act, but also in anticipation of future policy changes in Medicare health services financing.

Section Three – Contributions of this Research

The literature regarding policy changes in the health care sector of the United States economy has primarily focused either on hospital organizations or the individual provider. The traditional economic analysis of physician health services delivery has developed from the model of the individual provider responding to market influences (Ellis & McGuire, 1986; Hadley, Reschovsky, Corey, & Zuckerman, 2009). While this model, developed from classic microeconomic theory, provides insight into the ability of a free-market model to explain provider production behavior in the health care sector, it does not take into account the effect of organizational structure and constraints in the production model.

When considering the production of health care services within the context of a medical practice organization, this examination has been based either on regional analyses (J. E. Kralewski, Wingert, & Barbouche, 1996) or through select localities in national tracking surveys (L. P. Casalino et al., 2003). Additionally, there is not a current body of research literature focusing on the responses of medical group organizations to national policy changes and regulatory shifts in the health care sector. Literature in this area more typically reports trends of health organizations in response to broad sector shifts, and not necessarily in relation to specific policy initiatives (L. P. Casalino, Pham, & Bazzoli, 2004).

A final concern in research involving medical practice organizations is the lack of operational data to inform the attitudinal information obtained, and extending this to examine hypotheses regarding organizational behavior and environmental responses. Recent research into the complexity of medical groups utilizes qualitative techniques to assess organizational culture, but these findings are not strengthened with quantitative analysis of the efficiencies or financial performance of these organizations (Nembhard, Singer, Shortell, Rittenhouse, & Casalino, 2012).

This research presents an opportunity to combine the qualitative responses of medical groups to a national policy initiative with the quantitative data of those organizations' revenue, cost, and production functions. The potential of creating a model of medical group practice organization response to environmental changes can inform health care sector policy initiatives.

CHAPTER TWO: ORGANIZATION OF MEDICAL SERVICES IN THE US HEALTHCARE SYSTEM

The health care industry has been in constant change since medical services were recognized as a distinct sector of the economy. While economic considerations shaped medical practice activity prior to the creation of the United States, it was the rise of differentiated social structure in the mid-nineteenth century that fostered the development of organized medicine as a distinct professional component of the American economy. Paul Starr notes that the period of 1850 through 1930 witnessed the consolidation of professional authority among physicians. This derived from the development of a profession that received both economic power and status attaining from the ability of physicians to take advantage of having America's greater "social interests defined so as to conform to their own" (Starr & American Council of Learned Societies, 1982).

Physicians utilized an expanding body of scientific knowledge to demonstrate an increasing competence in the ability to create positive interventions in the health status of individuals. Coupled with the retreat of private judgment in matters of public health and hygiene to institutionalized collections of knowledge, primarily within teaching institutions, physicians were able to increase both their incomes and prestige. The practice of medicine had become a highly desirable profession. Entry into medical school became highly selective subsequent to the Flexner report (which in 1910 exposed the

failings of proprietary medical schools and lead to the closing of 31 within four years) (Flexner & Carnegie Foundation for the Advancement of Teaching, 1972).

From the professionalism of medicine to the development of organized collectivities for medical practice (professional associations, medical groups, pre-paid medical practices, and independent practice associations as examples), there has been an increasing examination of the organized delivery of medical services to solve public policy issues such as access, costs, and outcomes in the provision of services in the medical sector. At present, the debate over systemic reform in the health sector has called for the creation of “accountable care organizations” (Berwick et al., 2008). These entities, conceptualized as an extension of the traditional hospital medical staff into a larger medical organization, potentially incorporating existing medical organizations, are proposed to address the issues of improving quality and lowering costs of health care services. Fisher et al (2003) provide tantalizing evidence that a model of a hospital-associated multispecialty group practice produces superior outcomes in risk-adjusted mortality as measured by care connected with heart attacks, colon cancer and hip fractures. The high-performing institutions on these measures also had better outcomes in ambulatory care quality measures such as mammography screening in women, and diabetic testing in high risk groups. Completing the support for these organizations is evidence that high-performing institutions achieved these results with great efficiency. The longitudinal costs of ambulatory care in the high-performing hospitals were 26% lower than costs in the lowest quintile of measured hospital organizations.

It appears that ACOs are the latest construct proposed to alleviate issues of access, outcomes, and costs, which form the “Holy Trinity” of health policy analysis. However, it is not specifically the case that ACOs can only arise from hospital organizations. The research of this dissertation is to examine the factors that engage medical group practices in the development of these new organizations. This chapter examines medical group practices as the drivers in implementing the development of ACOs.

Section One – Medical Group Practice in the Health Sector

Medical group practice is an organizational construct for the practice of medicine that has emerged as a significant element of the United States healthcare system. Health policy research has been increasingly concerned with developing non-market based solutions to the multiple inefficiencies that exist in the health care market. (Berwick et al., 2008) Recent literature has examined the growth in numbers and development of services provided in medical group practices as a key component of proposed reform measures which have recently been enacted by Congress (Fisher, Staiger, Bynum, & Gottlieb, 2007). Although there is no consensus on the appropriate medical practice model, the concept of a “patient-centered medical home” is emerging in policy discussions as an improved framework for the delivery of healthcare services, structured around a primary care physician who is interconnected with a complete range of medical resources, including medical and surgical specialists, hospitals, nursing homes, and a comprehensive array of services (Paulus, Davis, & Steele, 2008). Medical group practices, specifically those with primary care providers (generally defined as family practice physicians, internal medicine specialists, pediatricians, and gynecologists) are

posited as the focus of the medical care model. Simultaneously, there is an increasing concern with the appropriate alignment of incentives in the delivery of medical care and the increased accountability of all segments of the health care industry to provide efficient, outcome-driven health care services. This health policy research has focused on the creation of ACOs that align the incentives of hospitals and providers to increase both the efficiency of services provided and improve the quality of the outcomes achieved (Fisher et al., 2009).

These models are the latest in a series of structural changes proposed for the delivery of medical care in the United States, notwithstanding clear differences of both role perception and anticipated resource availability between policy makers and medical group practice physicians. Initial research on the adoption of organizational paradigms to promote these systems of care suggests that elements of the model are present in existing medical groups, but that the model is emerging and not fully developed at present (D. Rittenhouse, Casalino, Gillies, Shortell, & Lau, 2008). The Robert Graham Center, a health policy institute of the American Academy of Family Physicians, delineated seven core features that defined the patient-centered medical home (Robert Graham Center, Policy Studies in Family Medicine and Primary Care, 2007). These features included a personal physician with an ongoing relationship to the patient; physician-directed medical practice of a medical team; an orientation to treating the whole person in all stages of life; the provision of coordinated and integrated care across organizational boundaries; a focus on quality and safety in the provision of health care services; improved access and communication in the provision of care; and payment systems that reward the extra value

added from this model of care. In examining the potential of this model within existing health care organizations, researchers analyzed data from the 2006-07 National Study of Physician Organizations (NPOS2) (D. Rittenhouse et al., 2008). Their research found that evidence of the use of patient-centered primary care teams in the provision of care in about one-third of the three hundred medical groups included in the data analysis. The study created an index to measure the degree to which each group surveyed incorporated components of physician-directed medical practices, care coordination and integration, quality & safety, and enhanced access. The enhanced access index summarized patient access to electronic medical records online, the utilization of group visits for care provision, and the degree to which physicians used email for patient communications. While finding elements of organizational infrastructure supporting patient-centered medical homes in almost all groups in the sample, the mean and median scores for these primary care medical groups were only 7 out of 20 possible points. Twenty-six groups (9 percent) were identified as high performers, in that they scored in the highest percentile on all four components, but none of the groups scored the maximum of 20 points. Additionally, Berenson (2008) notes that the concept of a patient-centered medical home is shift from a previous model of chronic care management, which was well-suited for implementation in highly-resourced large multispecialty group practices (Berenson et al., 2008). However, with almost two-thirds of providers practicing in groups of five or less physicians, the lack of resources (management infrastructure, electronic health records, and access to disease registries, among others) coupled with income disparities for primary care physicians based on current fee-for-service payment mechanisms, suggests

that adoption of this model may not realize any significant changes in the outcomes of the current medical care system (Shields, Patel, Manning, & Sacks, 2011).

A common thread in these health policy discussions is the consideration of providers (primarily, but not exclusively, physicians) as organizations of collective behavior. To gain an understanding of the implications of policy solutions for the delivery of health care services, this chapter examines the organizational framework of the healthcare industry in the United States with an analysis of the evolution of medical group practices within that framework.

Section Two – Development of Medical Group Practice Organizations

The concept of a medical group practice has traditionally been defined as physicians practicing medicine and/or surgery in a cooperative enterprise. This broad conceptualization has been more formally defined by the American Medical Association as: “the provision of health care services by a group of at least three licensed physicians engaged in a formally organized and legally recognized entity: sharing equipment, facilities, common records, and personnel involved in both patient care and business management”(Havlicek & American Medical Association, 1996). This definition references the organizational nature of medical group practice, and emphasizes the structure of medical groups over the function of medical services. This definition comes surprisingly late in the development of organized medical group practices.

A 1931 report to the Committee on the Costs of Medical Care noted that there was not a consensus definition of medical group practice. For the purposes of the analysis presented in its study, the committee defined a “private group clinic” as being

organized through professional, financial, and administrative characteristics (Rorem, 1971). This working definition included the shared nature of resources, the availability of more than one medical specialty service, the joint responsibility of the group to its patients, pooled financial arrangements and a degree of disengagement between direct medical service provision and individual income, and business structures including the use of lay management for administrative responsibilities, and formalized credit and collection functions.

While several antecedent models such as the teaching hospital, the dispensary clinics, and industrial medical service organizations exemplified physicians practicing together (Madison, 1990), the beginnings of the current structure of medical group practice were developing away from the urban centers. The Mayo Clinic, located in rural Rochester Minnesota, was formed by two brothers who joined their father in the practice of medicine and surgery. They quickly attracted another five physicians, and by the beginning of the 1900s were actively involved in providing medical care in several specialty areas. Similar medical group practices, emphasizing the multidisciplinary approach and business arrangements noted in the formal definition began to emerge, with these organizations utilizing the Mayo model to organize the method of providing medical care within a physician controlled and owned organization (Wenzel & Wenzel, 2005).

The literature has noted the continuing growth of medical group practices, both as single specialty organizations and as multispecialty groups providing a broad array of treatments and services (Starr & American Council of Learned Societies, 1982; Scott,

1993; Casalino, Devers, Lake, et al., 2003). As these groups developed and became an increasing structure for the provision of medical services, research began to focus on the organizational basis for performance. Early research examined the structural characteristics of medical group practices, seeking to delineate the relationship between the increasing size of medical groups and the emergence of more hierarchical and bureaucratic structures (J. E. Kralewski, Pitt, & Shatin, 1985). Kralewski's examination of 247 medical group practices in Minnesota revealed that administrative differentiation and perceived formalization was positively correlated with group size. Moreover, the type of group was similarly correlated, with more complex groups (multispecialty practices) exhibiting a higher level of administrative complexity. Larger, more complex groups exhibited a shift from physician-centered to administrative-centered decision making on issues such as setting hours of operation, fees, and organization expansion, both in terms of physical locations and services offered to patients. This differentiation implies a change not only in operation of the business entity, but also in the culture of the organization. This shift is a notable counter to the position that group practices are simply aggregates of solo practitioners who do not relinquish professional autonomy in affiliating together (Eliot Freidson, 1974).

Subsequent research (J. E. Kralewski, Wingert, & Barbouche, 1996) created a conceptual model of physician practice styles. Iterative presentations of a survey instrument to physicians in one hundred medical groups yielded a nine-dimension model of group practice organizational culture. The model tests the assumption that in conditions of uncertainty, physicians will be influenced in the utilization of resources by

the organization in which they are a participant, and by the environment in which the organization exists. The dimensions included innovation/risk-taking, group solidarity, cost-effectiveness orientation, organizational formality, methods of cost control, centralization of decision making, entrepreneurship, physician individuality, and visibility of costs. The validation of the survey instrument, measured through the correct placement of physicians into either prepaid clinic (HMO) or fee-for-service group practices, suggests that the dimensions are reliable group practice culture measurements.

This model was evaluated to contrast the role of group practice culture versus organizational structure in determining resource use in the treatment of hypertension (J. E. Kralewski, Wingert, Knutson, & Johnson, 1999). This study of resource use in hypertension management did find that group practice culture was more explanatory of the costs of these treatments, although both cultural and structural variables combined accounted for only eight percent of resource use variance. This result implies a limitation of the culture of medical organizations to control individual professional autonomy, but it can also be argued that the survey instrument did not identify the appropriate variables of organizational culture.

The model of medical group practice culture was subsequently revised as a result of research utilizing factor analysis to group together responses on thirty-nine statements into nine cultural dimensions (J. Kralewski, Dowd, Kaissi, Curoe, & Rockwood, 2005). The final instrument differentiated the culture of medical groups on the dimensions of: collegiality, information emphasis, quality emphasis, management style, cohesiveness, business emphasis, organizational trust, innovativeness, and autonomy. These

dimensions were assessed in a survey of 148 medical groups, and the validity of this instrument was established (Curoe, Kralewski, & Kaissi, 2003). In examining responses of these medical groups in terms of size, ownership, location, specialty (single specialty vs. multispecialty groups), the researchers found results that confirmed expectations based on organizational theory. The cultures of these groups shift as they become larger and more complex, either through diversification into multispecialty practices or through acquisition into larger health care systems. As groups become larger, more clinically diverse, and owned by larger entities, the practices become less collegial, less cohesive, and the groups exhibit less organizational identity and trust. The physicians in these groups perceive their organizations to be less quality oriented, less innovative, and more business oriented. The strongest cultural differences were between single specialty and multispecialty group practices, where more diverse organizations exhibit lower organizational identity, lower cohesiveness, and lower organizational trust. Additionally, the authors reported that there was notable variance within organizational types, especially on the dimensions of business orientation, innovativeness, and information emphasis.

These results suggest a level of cultural complexity that may exist within groups as well as across organization types. The application of this analysis was extended in an examination of the performance of medical groups in factors of clinical quality of care, financial performance, and organizational learning capability (Stephen M. Shortell et al., 2005). Data from the National Study of Physician Organizations was used in a multiple logistic regression to identify the effect of four major predictors of physician organization

performance. These drivers included environmental forces, resource acquisition factors, resource deployment factors and the quality-orientation of the medical group practices. Differences in the performance measures were noted between medical practices based on the size of the medical group and the degree of multispecialty services available. The most notable finding was the importance of having a quality-oriented group practice culture and the outside reporting of results (such as participation in a quality demonstration program) on the differentiation of high-performing vs. low-performing medical groups. The authors note that the findings "...suggests the potential utility of examining not only the external environmental factors but also the ability of the physician organizations to acquire and deploy resources and to develop a culture that emphasizes continuous improvement of the quality of care" (Stephen M. Shortell et al., 2005).

This affirmation of organizational culture in connection with environmental resources provides a framework for examining the potential for medical group practices to successfully participate in ACOs. But the construct of medical group practice culture is confounded by multiple cultural types that are not necessarily correlated with organizational size or diversity. A recent study (Nembhard, Singer, Shortell, Rittenhouse, & Casalino, 2012) found multiple diverse culture types, both within and across multispecialty medical groups. Conducting a qualitative analysis of interviews from a small subset organizations surveyed in the National Study of Physician Organizations, the authors revealed the presence of seven culture types: group, hierarchical, rational, developmental, quality oriented, patient centered, and physician

centered. The existence and degree of culture types observed in these medical groups were influenced by factors of financial influences, people (traits and functionality), leadership, structure (organizational, work groups and supports structures), processes of human resource practices and improvement, and the external environment.

The authors noted that none of these factors were more significant than any other in influencing specific culture types. However, while these factors could be either facilitators or constraints on the development of a group cultural type, within this sample a clear predominance of patient-centered and rational group cultures was observed. The discussion notes that this evidence supports the alignment of these organizations with Berwick's triple aim emphasis of reducing health costs (a rational goal) and improving population health (a patient-centered goal) (Nembhard et al., 2012). However, less supportive of the concept that medical practices are prepared to participate in delivery systems such as ACOs is the findings of a lower prevalence of both developmental and group orientation cultures. This suggests that medical groups may be less able to respond to environmental pressures in adapting new organizational structures.

The above review of medical group practice development, organization, structure, and culture reveals mixed results in the examination of these entities. While organizational size is positively related to administrative complexity and differentiation, it is also related to cultural traits of less group cohesiveness, lower quality orientation, and an absence of innovation. These traits imply that while organizations may become increasingly large, they might not be able to effectively adapt to external environmental factors. The efficiencies that must be developed to meet the challenges of policy shifts

such as the introduction of ACOs cannot be predicted by examining group practice culture or its size alone.

CHAPTER THREE: LITERATURE REVIEW

The literature review presented in this chapter examines economic theories of the growth of the firm and organizational theory that informs the development of medical group practices. Two broad schools of economic theory, one focusing on contractual relations and the other focusing on the competence, or capabilities, of firms are reviewed for insights applicable to medical group practice responses to ACOs. Similarly, in organizational theory, population ecology is seen to have relevance to the development of ACOs and the response of medical groups.

Section One – Economic Theory and Medical Group Practice

The development of the group practice of medicine discussed above is typically described as emerging for purposes of convenience, differentiation of medical skills, and economic efficiencies. The definition from the AMA of medical groups as physicians “sharing equipment, facilities, common records, and personnel involved in both patient care and business management” implies an acknowledgement of this efficiency argument without a deeper examination of organizational structure and behavior. There has been an increased concentration of both the number of medical group practices (Havlicek & American Medical Association, 1996) as well as the number of physicians joining medical groups (Gaynor & Haas-Wilson, 1999), and it is important

to consider the reasons for this increased participation of these firms in the healthcare sector.

Economic theories of the firm generally focus on the existence of the firm, the boundary between the firm and the market(s) in which it participates, and the organization of the firm (N. J. Foss, n.d.) The initial economic theoretical analysis of why firms come into existence was developed by Frank Knight (Knight, 1965). His analysis of the roles of risk and uncertainty in economic production suggested that organizations arose from the ability of certain individuals to more successfully navigate uncertainty in the market. Firms arise as a mechanism by which entrepreneurs exercise their competence in recognizing and managing uncertainty. This suggests that entrepreneurship is idiosyncratic, and stands as a specific resource that is employed by the organization to achieve its ends. And Knight states that this ability to successfully manage uncertainty is not a marketable object, and thus firms develop around this unique resource rather acquiring it in the open market as a mechanism of production. The very idiosyncrasy of entrepreneurial competence implies that there is not a market for it, and firms arise to use this competence in production, and the entrepreneur becomes the residual claimant of the profits of the firm.

This competence perspective stands in contrast with theories of the firm that build on the nature of contractual relationships between producers in the market. Ronald Coase developed a theory of the firm that emphasized the costs of transactions (Coase, 1937). When the cost of coordinating activity in production could be accomplished at a lower cost than obtaining the factor of production in the market, relationships develop that give

rise to the firm. He theorizes that there are costs to using the market price mechanism, the most obvious being the costs of discovering relevant prices. When contingent contracts are made in which the details required of the supplier are to be determined by the purchases, Coase argues that the relationship is not controlled by the market price mechanism, but through entrepreneurial coordination. This relationship is the basis for the firm, which he defines as an organization which “consists of the system of relationships which comes into existence when the direction of resources is dependent on the entrepreneur.”

However, this conceptualization of the firm as a grouping of contractual relationships leads to implications of the importance of performance and monitoring. Alchian and Demsetz examined this issue, and developed an explanation of the development of the firm in terms of team-production to increase marginal productivity (Alchian & Demsetz, 1972). Their basis of coordinated activity was noted as a solution to the potential problem of shirking in coordinated production. Monitoring activity to adjust contracts or inputs into the production process is seen as more efficient than relying on market operation. The firm emerges as a contractual structure of multiple owners of inputs, but with one residual claimant to the production who can alter the contracts of each input independently of the other inputs, retains the residual claims of the production of the team, and has the right to sell this residual status. The success of the firm can be evaluated in its ability to minimize the costs of monitoring team production.

Later examination of this governance issue suggested that the emphasis on monitoring joint input production is a narrow view that can mask the larger analysis. Jensen and Meckling note that contractual relations form the essence of the firm, and this includes not only the efforts of employees, but also the firm's relation to suppliers, customers, and other parties (Jensen & Meckling, 1976). They expand the notion of the firm, and place it clearly in the domain of relational costs, emphasizing that firms are essentially the nexus for a series of contractual relationships between individuals. Their work develops an expansion of the concept of agency costs that explains governance issues within organizations as an issue of monitoring. And Jensen and Meckling note that their examination of this model suggests that one alternative explanation for ownership structures of the firm derives from the role of limited liability, which is echoed into the shift of physicians from solo practices to various legal organizations (corporations, limited liability companies, professional associations) all of which have the feature of reducing risk to the individual.

An alternative set of theories of the firm are based not in the contractual nature of relationships between factors of production, but instead on the competencies, or capabilities, of the organization as a more efficient performer in the market economy. An early theory of the capabilities school conceptualized the firm through its administrative organization (Penrose, 1995). Edith Penrose stated that the function and nature of firms are to utilize resources to supply goods and services for the market economy "in accordance with plans developed and put into effect within the firm." This emphasizes the firm as a collection of productive resources that are only important when properly

employed through coordinated managerial plans and administrative arrangements. This effective utilization of resources is the source of growth for the firm. Penrose also acknowledges the importance of the entrepreneur to “see” and exploit the productive opportunity to which the resources can be utilized. However, unlike the contractual theories noted above, this capabilities approach suggests that the goal of this activity is the growth and success of the firm itself, not the distribution of residual profit to the responsible risk-taker. For Penrose, profits are the motivation of the firm, but for the purpose of reinvestment in the firm, and continued growth. Interestingly, she states that the acquisition of other organizations is not firm growth, unless the acquired firm is integrated into the production activities of the larger firm. In this approach to the firm, it is the activation of managerial capabilities in the coordination of these resources that determines the nature of the firm.

This approach implies that the growth of a firm is only limited by its ability to alter and reallocate administrative and managerial capacity throughout the organization. However, as firms increase in size and production functions, Penrose notes that the firm will have changed in such that it cannot be simply considered a larger presentation of its prior operation – it becomes a different entity, thus “we cannot define a caterpillar and then use the same definition for a butterfly.” Vertical integration occurs for the same reasons suggested by the contractual approach, that acquisition of inputs of production are a “make-or-buy” decision faced by the firms. However, beyond the mere cost perspective, the capabilities approach acknowledges the capacities of the firm to efficiently combine resources into new combinations. And in this approach, the costs of

integration include not only the operational costs of resource acquisition, but also the opportunity costs of using managerial resources in this process. Penrose does not see a limit to the growth or size of a firm based on the limits of an arbitrary optimum size. The limiting factor here is managerial capacity, and the lack of any absence of new knowledge to expand managerial efficiencies.

The ability of the firm to utilize its administrative and managerial capacities depends on its ability to develop specific skills (Nelson & Winter, 1982). These skills are a capacity for “a smooth sequence of coordinated behavior.” The skills are seen as programmatic, using tacit knowledge to construct routines that function as organizational memory. Importantly, these routines are not fixed, but adapt as the organization faces a shifting environment. This evolutionary approach implies that the nature of the organization is built on the integration of skills and managerial capabilities with the specific resources and technologies. However, this evolutionary theory of economic change is built on the concept that organizations have built into them a set way of both acting and determining a course of action. Organizational efficiencies are obtained from codifying established routines. This in turn can limit the scope of flexibility from routinized behavior, and thus “a changing environment can force firms to risk their very survival on attempts to modify their routines.” Nelson and Winter characterize these routines as the genetic basis of the organization, noting that firms would be expected to behave in the future based on routines previously used, producing in the future behaviors based on following past routines, regardless of external influences. However, they note that organizations include the capacity and function of search. This evolutionary theory

of economic change states that search “denotes all those organizational activities which are associated with the evaluation of current routines and which may lead to their modification, to more drastic change, or to their replacement.” As with managerial and production processes, search processes are also routinized, but analogous to evolutionary theory, search processes can mutate based on environmental factors.

The concept of external environment brings into focus the questions regarding the boundary of the firm, and beyond the issues of growth noted by Penrose, the observed behavior of vertical integration. The issues of integration, and thus boundaries, can either be considered in terms of the need to acquire competence or as a mechanism to increase capabilities (N. Foss, 1993). Foss examines both the theoretical underpinnings of Knight’s comments on entrepreneurial idiosyncrasy and Penrose’s integration constructs to examine the issue of coordination. He suggests that organization acquisition (growth) is not the result of economizing transaction costs. The problem is an issue of appropriate knowledge, which is only resident within the integrating firm that knows exactly what it needs. The competence required of the other firms in the market is either non-contractible to the receiving firm, or only contractible through extraordinary information costs. This conceptualization shifts the basis of integration (and thus firm boundaries) from an emphasis on the nexus of contracts, monitoring, or aligned incentives to a perspective of competency acquisition.

This dynamic approach emphasizes the coordination function, and suggest that firms arise as “solutions to coordination games” (Langlois, 1995). Firms are considered to comprise two major parts: an intrinsic core of elements that are defined as

“idiosyncratically synergistic, inimitable, and noncontestable” and ancillary capabilities which are contestable and not necessarily unique. In this theory of the firm, the boundaries of the firm will be determined by the necessity and costs of acquiring capabilities not currently controlled by the firm in response to changes in the external environment. Langlois and Robertson note that the idiosyncratic knowledge of firms allows them to use resources to create new capabilities, which in turn provide competitive advantage of over rival firms. The growth, and boundary, of the firm can be considered as either a short run or long run solution to the acquisition of capabilities. In the short run, a firm will possess a relatively high degree of idiosyncrasy, with relatively high transaction costs to internally develop certain capabilities. The external environment has a thin array of available specific capabilities. This suggests that the relative cost of acquisitions of these capabilities is low compared to their internal development, and implies a response of vertical integration. However, in the long run the idiosyncrasy of the firm is low in relation to competitors, particular capabilities become more widely available in the sector, making the transaction costs of utilizing particular capabilities low, and as a result leading to less integration than first movers.

However, the routines and capabilities that define the core of the firm can also create organizational inertia, specifically in constraining the learning process of the firm. Thus well-established organizations may be slower to adapt to external changes than newer firms which are both less encumbered by prior routines, and have more capacity for adaptive change. Langlois and Robertson hypothesize that those firms adept in utilizing existing technologies and procedures are less likely to embrace new

technologies and procedures than firms that are less adept. A related hypothesis is that in presence of a major innovation, the more that innovation is compatible with existing capabilities the more likely existing sector leaders will continue to dominate. However, if the innovation is essentially entirely new for the sector, then the benefits of the innovation will go to those firms that already have access to the most relevant capabilities. And these firms may either be existing firms in the specific (or related) sectors, or entirely new firms.

The hypotheses of this capabilities approach have specific application in examining the response of medical group practices to the creation of ACOs. As an organizational construct, ACOs are similar to the Health Maintenance Organizations (HMOs) that were prevalent during the 1990's. HMOs also organized the provision of health services around the construct of a coordinated approach to health delivery, with each insured enrolled in an HMO being assigned to a primary care provider. Similar to the underlying construct of an ACO, there was an assumption that this coordination mechanism would lead to earlier and more effectively delivery of health services, lower utilization of unnecessary resources, and better health outcomes for the insured population (Luft, 1981). Although the financing mechanisms differ (capitated fixed prospective payments for specific services with an enrolled HMO population versus shared cost savings retrospectively in an ACO), the organizational construct does not appear to be substantially different. What has changed in the intervening twenty-plus years is an emphasis on population outcomes, a requirement to utilize electronic health records, and perhaps most importantly an emphasis on measuring, reporting, and

improving the quality of services provided. These changes are not trivial, and represent a new and different environment than has existed for medical group practices since the decline of HMOs in the later 1990s. The question of how medical practices organize in response to environmental influences is examined in the next literature review section. The population ecology perspective of organizational theory is reviewed in the perspective of medical organizations.

Section Two – Organization Theory and Medical Group Practice

The medical profession and medical group practices have been examined in the context of various sociological theories of organizational development and behavior. An early critique of the organization of the medical profession was developed by Eliot Freidson (Eliot Freidson, 1970). Examining the position of physicians in the US healthcare system, he observed that changes occurring in this sector of the economy are best understood from the perspective of the “professional dominance” of the medical profession. His underlying construct is that physicians place high utility on professional autonomy, and will seek to create practice settings that allow them to practice as they best determine. The most autonomous organization for the practice of medicine is the solo, fee-for-service, practice. However, the physician is vulnerable in this arrangement, either from the non-contractual impermanent loyalty of patients or from competition from peers in the medical profession.

Thus totally autonomous individual practices are inherently unstable, and Freidson argues that the environment requires the development of practice organizations to minimize the controls exerted either by the patient or by competitors. This analysis is

summarized as either physicians banding together to “minimize the tyranny of client choice” or remaining independent to “minimize the tyranny of colleague choice” (Wolinsky, 1985). Freidson’s conclusion suggests that the development of medical group practices, especially for primary care physicians, was a logical response to the issues of client control. His typology of medical practices implied an increasing level of collegial control moving away from solo practice to associations, partnerships, and at the most collective level the multispecialty medical group practice.

Interestingly, Friedson defined a medical group practice as a minimum of five physicians practicing together, as opposed to the three-physician standard noted previously. His thoughts regarding the future of the medical profession emphasized increased rationalization and formalization (E. Freidson, 1985). He presciently suggested that large scale settings of physician practices such as hospitals, clinics and groups would be a response to “continuing efforts to control costs...to prevent increase demands on public funds”.

This conceptualization of the development of medical group practice draws on open systems organization theories, including a construct of resource dependency. The control of uncertainty is theorized as the predominant issue facing organizations, and organizations respond through obtaining the power to both control and to benefit from resources in the environment (Pfeffer & Salancik, 1978). The resource dependency perspective goes beyond locational decisions as organizational responses to environmental conditions to an emphasis on strategic adaptations that are employed to exert control over the environment. In this manner, organizations compensate for their

lack of internal self-sufficiency through increased interdependence in the environment. Pfeffer and Salancik suggest that this response implies a greater response to those elements of the external environment that control the critical resources required by the organization. The managerial response to this dependency is to alter both the structure of the organization, and the environment in which it resides, to achieve organizational survival and freedom from external constraints.

Examining Freidson's concerns of professional dominance within this framework of resource dependency suggest that physicians will act to minimize the unpredictability of client loyalty by joining with other physicians (through partnerships or mergers). This does reduce the client control exerted by patients, but subjects the individual physician to greater control exerted by colleagues. Critiques of Freidson's approach attribute the spectrum of models of physician organizations as responses to the conflicting constraints of patient control vs. colleague control of physician professional autonomy (Rundall, 1987). Ranging from the solo fee-for-service practice to a group model Health Maintenance Organization, these settings provide increasing levels of colleague control combined with decreasing levels of patient control. This theory suggests that physicians have a "threshold of acceptability" regarding the external control of their medical practice, and will move into increasingly complex practice arrangements to minimize the potential of patient control over their practice autonomy. This resource dependent consideration of medical practices implies that medical practice organizations that emerge are transformations of earlier (such as solo practice or small group) forms. These

transformations are specific responses to adapt the medical practice to its current environment.

Contrasting this transformational model is the population ecology perspective which derives from concepts of biological ecology. The population ecology model examines the selective processes that determine changes in sets of organizations. To clarify the unit of analysis, it is important to note that this model examines the population of organizations in an environment, rather than a specific member-organization of that population (Hannan & Freeman, 1977). In this context, successful organizations are noted to be those members of the population that adapt to changes in the external environment through adaptation to the constraints they face. In the biological context, organizations resemble species best suited to a changed (or changing) environment, and will increase in number to a population size that “can be supported over the long term by a stable environment (the population ‘carrying capacity’) of the environment” (Rundall, 1987).

Rundall examines the development of medical group practices within the framework of population ecology to explain the emergence of groups differentiated in dimensions of size, specialty mix, and revenue models. In this analysis, population ecology informs the organization process by noting that both the availability of resources, and the level of competition for those resources, create a process in which these environmental factors are determinant of the physician practices that best fit the environment. This process includes the progressive steps of variation (the emergence of different organizational forms), selection (survival of organizational forms that are best

able to exploit external resources), and retention (succeeding organizations are preserved, duplicated, and or reproduced within the environment). For medical groups, the relevant issues of consideration are the environment of the medical practices, the typology of medical practice organizational structures, and the characteristics of medical groups that are critical in ecological analysis.

The environment facing any organization can be examined on multiple dimensions, with researchers identifying nine dimensions that can act as selective forces on organization development (Aldrich, 1979). While there are many dimensions that can affect the medical group practice organization, the quantity of natural resources is the most critical. As evaluated in the context of the health sector environment, the level of resources can best be conceptualized as a population of patients with the ability to pay for services provided by the organization. The level of this resource is influenced by both the trend in patients with the ability to access health services (typically operationalized through third-party insurance coverage) and by the competition for those patients from other organizations (such as physician groups and health delivery systems) in the environment.

Rundall's examination of physician group typology focuses on the characteristics of specialty composition and size. During the period of his analysis (1968 through 1984) medical group practices increased both in size and complexity. Analysis of American Medical Association surveys of medical group numbers and characteristics reveals an increase in medical groups of all types, and the increase in membership of physicians in medical groups. However, there was greater growth in single specialty groups in this

period. While growing larger in terms of physician members in each group, multispecialty groups declined as a proportion of medical group practices and over one thousand multispecialty groups either merged into other organizations or disbanded between 1980 and 1984.

These results are attributed to several environmental selection factors. Economic pressures such as the costs of capital, advantages and efficiencies of scale, increasing physician-to-population ratios and declining number of mean visits per capita are all viewed as environmental factors favoring the development and increase of a population of medical group practices that are more adapted to survival than independent solo practitioners. Also noted is the contraindicated result, namely that the organizational form of single specialty practices are growing with a corresponding decline in multispecialty practices. Rundall asserts that population ecology theory would predict the opposite; in that generalist forms such as multispecialty practices should be better positioned to attract more patient demand under conditions of increased competition. However, his analysis neglects the consideration of increasing access to health services during this time by patient populations, and the ability of organizations to exploit this resource by concentrating service provisions with higher intensity services, based on advances in both medical procedures and medical technology.

Population ecology is predictive of both the increase of medical group practices and the increasing size of medical groups. As a reaction to the increased emphasis on cost control of medical expenditures, particularly through the development of managed care financing models in the 1980's, the environment shifted dramatically against the

survival of individual providers. This response occurs as a reactive adaption to these environmental factors, and may not increase either the availability of medical services or the efficiency in provision. As other reviews of population ecology constructs in medical services organization have noted, medical organizations respond strategically for a better fit with the environment, and nothing more (Kaluzny & Hernandez, 1983).

Further research on the emergence of health care organizations from the population ecology perspective suggests the importance of both the numbers and size of existing organizational forms with similar identities to new organizations (Ruef, 2000). This examination of forty-eight health sector organizational forms (including hospitals, medical group practices, health maintenance organizations, and ancillary services such as optometrist offices and pharmacies) incorporates regulatory events in the timing of the appearance of forms, which is appropriate in the institutionalized health care sector. Examination of the emergence of abortion clinics subsequent to the 1973 Supreme Court decision and HMOs subsequent to the federal HMO act (P.L. 93-222) are analogous to the current potential for the development of Affordable Care Organizations subsequent to the enactment of the Patient Protection and Affordable Care Act.

Ruef's analysis reveals that the development of new organizational types is influenced by both the number and size of existing health sector firms. The greatest impact is found in organizations that have similar identities to emerging forms of health sector organizations. As an example he notes that the legitimation and resources base of abortion clinics may have benefitted from "existing infrastructure and legitimacy achieved by a related form, such as family planning centers" (Ruef, 2000). In

considering the development of ACOs, the existing infrastructure of results-focused payment mechanisms (such as NCQA quality reporting measures and HEDIS measurements in managed care payment systems) provide a similar source of legitimation and resources base for medical group practices to develop into these new organizational forms.

Finally, an overview of organizational change in the health care sector reviewed the literature of macro-level change, examining research from both a resource dependence and strategic choice perspective and from a population ecology perspective (Fennell & Alexander, 1993). The authors note that while there have been a limited number of empirical studies of organizational change utilizing a population ecology framework, this perspective has analytical strength in examining organizational responses to institutional constraints. Institutional environments encompass the political and social structures with which organizations must conform (Scott, 2003). Fennel and Alexander define institutional environmental factors as including regulatory change, change in the medical profession, and changes in the normative environment of the health care sector. The factor of regulatory change correspond to the process of coercive institutional isomorphism (DiMaggio & Powell, 1983), and suggests that organizations become increasingly similar as a result of matching strategic responses to best fit a changed environment. It is with this perspective that this research seeks to examine the factors and constraints facing medical group practices in adapting to the regulatory environment introduced through the Patient Protection and Affordable Care Act.

CHAPTER FOUR: RESEARCH QUESTION AND HYPOTHESES

This chapter details the main research question and hypotheses for this research project. As mentioned above, the primary purpose of this dissertation is to examine the elements that make medical group organizations more prepared to either develop their own organizational structures or to combine with other organizations to succeed in a changed model of health care delivery payment precipitated by the implementation of the Patient Protection and Affordable Care Act.

The research question can be simply stated as “What are the organizational and environmental elements relating to medical group practices that make these organizations more likely to develop an Accountable Care Organization?”

As a component of the Patient Protection and Affordable Care Act, medical group practices have the opportunity to participate in ACOs. Both the clinical emphasis on population health and the increased shift to risk-based payment systems in ACOs provide an early mechanism involving Medicare patients for these organizations to gain experience, expertise, and knowledge resources in a new environment. Initially, health policy researchers believed that entry into ACOs would be primarily conducted by hospitals and integrated delivery systems (IDS). An IDS incorporates multiple healthcare organizations under one parent holding company. This model typically involves multiple hospitals entities under a system-level governance structure, and can also include

physician practices and health insurance companies such as HMOs. But the early participants in the Medicare Shared Savings Program ACO model were primarily physician organizations. Utilizing contractual networks that had been developed for negotiating with managed care companies, physician Independent Practice Associations comprised the majority of the original MSSP participants (Centers for Medicare & Medicaid Services, n.d.-b).

Later review of the growth of ACOs for both the Medicare population and in connection with commercial insurance carriers revealed that physician medical groups were primarily responsible for this growth (Muhlestein, Croshaw, Merrill, & Pena, 2012). This analysis from Leavitt Partners indicated that in the eight months beginning in October, 2011 the number of medical group-organized ACOs almost doubled from 38 to 70, while hospital and IDS-based ACOs increased by less than twenty percent, from 99 to 118. The report utilized a broad definition of ACOs, including numerous relationships between insurance companies and provider organizations that used some element of quality reporting and risk-based accountability. However, when this information is considered in conjunction with the specific enrollees of the Medicare Pioneer and Shared Savings Program ACO models, it is evident that medical group practices are the driving force of organizational change in response to this policy initiative. Understanding the elements that support or retard this response by medical groups is an important contribution to health policy research.

Building on the population ecology perspective, it would appear appropriate for those organizations that possess resources necessary to develop and grow in this new

environment to both more likely and more able to take advantage of this emerging organizational form. However, not all medical groups will either be interested or capable to develop ACOs.

Hypothesis 1: Medical Groups which have current elements that align with structural elements of Accountable Care Organizations will be more likely to participate in Accountable Care Organizations.

Rundall's population ecology approach in analyzing the development of medical group practices notes that the availability of pertinent resources create a process in which environmental factors are determinant of the physician practices that best suit the environments. The development of an ACO requires a shift from fee-for-service based revenue models to an organization that measures, values, and rewards mechanisms to improve population health. To accomplish this, medical group practices will need to possess and or to develop elements such as care management processes, quality measurement systems, outcome-based compensation systems, experience with risk-based financing and information systems that can provide meaningful data to measure these activities.

This approach is also suggested by research examining the performance of medical groups. The findings by Shortell et al (2005) regarding high-performing medical group cultures point to the importance of recognizing relevant external environmental factors in the creation of a quality-oriented group practice culture. In addition to predictors of group performance drivers such as resource acquisition and deployment factors, the findings specifically note the importance of outside reporting of results, such

as participating in a quality demonstration program. For medical group practices to participate in quality reporting there is an underlying organizational capacity requirement. Elements of this capacity at a minimum would involve mechanisms to capture meaningful data to measure and report on quality and clinical outcomes (through an electronic health record or similar means); processes to manage clinical information; systems of quality measurements; and processes to monitor patient care management systems. Additionally, it is not sufficient to simply have these elements in place within the organization if there is no motivation to utilize them to improve quality and change clinical outcomes. To achieve these differences as high-performing organizations, medical group practices should also have in place performance systems that align the achievement of these outcomes to the compensation of the providers in the organization. The medical group practices that possess these elements should be more likely to indicate an interest in participating in an ACO.

Hypothesis 2: Medical Groups that are more efficient in the production of medical services will be more likely to participate in Accountable Care Organizations.

In addition to possessing (or acquiring, see below) resources that create an appropriate fit with the new environment, those organizations that have achieved operational and financial efficiencies will possess organization slack to divert administrative resources to the development of an ACO. Nelson and Winter (1982) suggest organizations that have developed a capacity for efficient coordinated behavior will have the capacity to adapt to shifting environments. This conceptualization of capacity as organizational routine includes the potential for organizations to be at risk in

changing environments if they are unable to modify these routines. Another view of this issue suggests that organizations develop new or modified routines to overcome limited flexibility in organizational behavior. In the context of medical group practices, this coordinated behavior can be observed through the efficient provision of services, and can be measured through the productivity of healthcare providers.

The degree to which organizations can be aware of, and measure, routines which are important in a changed environment is a strong indicator their ability to adapt to new environmental forces. In the context of medical group practices in an environment of increasing accountability, these routines would be realized as changed performance measures. As groups shift from facing an environment in which success and continuity are dependent on constructs such as market share and revenue maximization to an environment that values efficiency and outcomes, successful groups will develop routines that can respond to these changing measures of success.

These routines would include measurements of group and provider efficiency, such as tracking the costs of operation for a provider to create a specific outcome. This is analogous to the shift in cost measurement in hospitals which occurred with the introduction of Diagnosis Related Groups (DRG) for Medicare Part A inpatient services in 1983 (Sloan, Morrissey, & Valvona, 1988). The provision of services remained transparent to the Medicare recipients receiving care, but hospitals measured quite differently the costs to provide that care, based on a changing payment system. Similarly, medical groups that are prepared, or at least preparing, to adapt to a changing payment environment for provider services would develop routines to understand and

measure the costs per episode of care. Moreover, understanding this changed environment might include examining the costs of providing care not only from the provider perspective, but also from the perspective of the third-party payer. For example, in providing total joint replacement surgery, a medical group that includes orthopaedic surgeons would want to understand not only the organization's costs (primarily the labor costs of the surgeon plus allocated organizational overhead), but also the external costs such as the cost of the joint implant, the hospital where the surgery is performed, and the post-surgical costs of rehabilitation. While there is currently a lack of price transparency for such common procedures (Rosenthal JA, Lu X, & Cram P, 2013), organizations are preparing for a shift in payment methodologies by examining costs factors from the payer perspective as well as the provider perspective. Medical groups that are more efficient, or are concerned about efficiencies in a new health care environment, will work to understand costs from external as well as internal perspectives.

Hypothesis 3: Medical Groups will initially consider the acquisition of resources, through contractual arrangements and mergers, to engage in services in connection with Accountable Care Organizations.

Langlois and Robertson note that firm growth can be considered as either short-run or long-run solutions to the acquisition of capabilities (Langlois, 1995). In the short run, the idiosyncrasy of firms suggests high transaction costs of internally develop capabilities. To effectively compete in a changing environment, it may be more appropriate for medical groups to merge into larger entities that have developed resources aligned with the shift to outcomes and population health emphasized in ACOs. This

suggests that these medical groups will be those that have developed arrangements with other organizations to exchange clinical data, will consider or have developed joint business ventures with other healthcare organizations, or have relationships with other healthcare organizations through entities such as Medical Services Organizations (MSOs), physician practice management companies, or an Independent Practice Associations (IPA).

There is also support for this construct in Penrose's characterization of the growth of firms. Her theory of the growth of the firm would suggest that medical groups would view the changing environment as an opportunity for growth. To the degree that organizations have sufficient internal resources, they can create new structures to take advantage of new opportunities. However, absent these resources, Penrose states that organizations will acquire additional managerial knowledge and capability for firm growth. As examined in the context of this research, it suggests that medical groups would enter into joint ventures and develop new organizational structures to obtain managerial expertise that in turn would be utilized for the continued growth of these organizations.

Exactly how well medical groups can execute an acquisition strategy may be tempered by the culture of the organization, and by its composition. As previously noted, Curoe et al (2003) found that multispecialty groups have a stronger business orientation in comparison to single-specialty medical groups. However, the opposite results were observed when measuring the emphasis on quality in medical groups. There may be an organizational effect depending on whether medical groups consider joint ventures and

new care process structures as mechanisms of firm growth versus “gateways” to successful participation in a new healthcare environment. To the degree that medical groups view these activities as organizational innovation, the research suggests that there will not be a difference between multispecialty and single-specialty groups. However, if medical groups consider activities as simply mechanisms for growth, there may be a stronger appetite for engagement by multispecialty groups.

Hypothesis 4: Organizational size and complexity will be related to medical group interests in developing or participating in an Accountable Care Organization.

The issue of organizational size and complexity is a consistent theme in the literature that has been reviewed in this research. Medical group practices have historically been noted for both their growth and the differentiation of the services offered by the organizations (Rorem, 1971; Starr & American Council of Learned Societies, 1982; Rundall, 1987). And theories of the growth of the firm (Penrose, 1995) suggest that as organizations increase in size, the managerial capabilities of the firm will also increase, providing resources necessary for continued growth as well as firm survivability.

Contrasting that view is the literature on medical group organizations and the effects of size on organizational culture. The size of medical group practices is typically measured by the number of full-time equivalent (FTE) physicians practicing in the organization. This is different from other sectors, where firm size is routinely measured by total revenues, or units of business activity such as locations (retail stores) or units of output (metric tons of material produced or number of automobiles). In the health sector,

the final output is an intangible termed “health” or the absence of a condition of less than health (Arrow, 1963).

Within medical practices, the provider is the basic unit of labor, and the output of that labor varies not only by resources employed to produce that output, but also the differential valuation of the unit of output in the market. For example, two primary care physicians may use widely varying resources (staff, diagnostic tests, drugs and other therapeutics) to treat two patients presenting with identical clinical conditions. And to extend this example, the revenue created for the medical group for these two patients will be more dependent on external constraints (primarily the third-party payment mechanism available to each patient) than differential production methods. Moreover, given the autonomy of physicians to diagnose and treat these patients, this example has as much applicability within medical groups as between them.

A methodology for comparing resource inputs within and between medical organizations does exist and is often used in payment for services. The Resource Based Relative Value System (RBRVS) was developed to match resource utilization with payment for Medicare services (W. Hsiao, Braun, Yntema, & Becker, 1988). However, the comparative measurement of resource input is not a facile methodology to compare the size of medical practice organizations. For comparative and research purposes, the differential for firm size in medical group practices is typically FTE measurements. And while this is an imperfect measurement of the capacity of organizations, it is a dimension that has been seen to reflect differences not only in organizational complexity but organizational culture.

The relevant research provides contrasting discussion regarding the importance and influence of the number of providers in a medical organization on issues of change and the development of new organizational structures. Berenson's (2008) research on Patient Centered Medical Home (PCMH) models suggests that these new models of care provision are more readily adapted by large group practices. This finding strengthens Kralewski's (1985) finding that larger, more complex medical groups shift towards an administrative-centered decision making culture. In this research, administrative differentiation and formalization was correlated with group size. And in line with economic theory, increased size should provide additional resources and organizational slack to expand the organization's scope of services and modify the productions methods. But recent research (Nembhard et al., 2012) provides evidence that medical group practice size leads to less group cohesiveness and an absence of innovation. Medical group practices that anticipate and plan for ACO development will require an internal alignment in strategic planning, as well as a developmental group orientation culture. A correlation between size and ACO interest may be the compounding of other organizational resources (such as electronic medical record system) that are not available below a certain organizational size.

CHAPTER FIVE: QUANTITATIVE ANALYSIS

The examination of the potential of medical group practices to participate in ACOs is examined through a quantitative analysis of relevant survey data from the Medical Group Management Association. This organization was created in 1926 as the National Association of Clinic Managers, representing the business managers of medical group practices. Now named the Medical Group Management Association (MGMA), its membership represents over 13,500 medical practices. These practices represent over 270,000 physicians who account for more than forty percent of the healthcare services delivered in the United States (Medical Group Management Association, 2011). The MGMA conducts regular research both for the direct benefit of its members (including surveys on organizational costs of the delivery of care, production and compensation of providers, and salary surveys) and also health services research for public dissemination. It has provided critical research of ambulatory health care in areas such as Patient Centered Medical Homes (with the Urban Institute and the American College of Physicians), the impact of physician compensation by insurers at the Medicare rate (with the Urban Institute), and the business case for EHR (with the University of Minnesota).

In June and July, 2011, the MGMA asked its membership to participate in an electronic questionnaire regarding the evolving healthcare environment. A total of 1,537 responses were received from a variety of medical group organizations. This

questionnaire provides the quantitative data to examine the research question in this dissertation.

Section One – Description of Survey Data

The survey document is reproduced in the Appendix. The survey comprises a total of thirty-three questions, including both demographic information regarding the medical group practices and responses to questions regarding the organizations' readiness to adapt to new processes and models of care delivery in healthcare services. When survey responses were examined against the Medical Group Management Association master file of medical practice organizations, eight surveys were determined to be duplicate submission of another survey from the same organization. To eliminate the duplicates, the responses to Question 27, "Which title best describes your position" was examined. The response with the more senior organizational title for each duplicate was retained.

The 1,529 surveys represent various types of organizations. Table 1 below provides a summary of the organization types.

Table 1 - Type of Organization for All Respondents

Medical Practice Organization Type	Freq.	Percent
Physician-owned medical practice	1,010	66.06%
Hospital-owned or IDS-owned medical practice	191	12.49%
Medical school faculty practice plan	64	4.19%
Other organization-owned medical practice	264	17.27%
Total:	1,529	100.00%

The respondents in the survey represented medical practices ranging from one physician to over three-thousand physicians. While large medical practices are becoming increasingly common (Casalino, Devers, Lake, et al., 2003; Casalino, Pham, & Bazzoli, 2004; Havlicek & American Medical Association, 1996), the previously discussed definition of a medical practice as comprising three or more physicians practicing together will be utilized for the analysis in this dissertation. Eliminating respondents from organizations of less than three physicians reduced the sample to 965 respondents. The distribution of medical practice size, as measured by full-time equivalent physicians is presented in Table 2.

Table 2 - Group Size - FTE Physicians

Numbr of FTE physicians	Freq.	Percent
3 to 5 FTE	259	26.84%
6 to 10 FTE	225	23.32%
11 to 25 FTE	218	22.59%
26 to 50 FTE	97	10.05%
51 FTE or more	166	17.20%
Total:	965	100.00%

These respondents will be used to analyze the research question regarding the likelihood of medical groups participating in an ACO.

Section Two – Description of Model

The Evolving Healthcare Environment survey asked respondents to describe the status of their organization regarding ACOs. The question (Q21) provided for four responses: 1 “Our organization believes are currently an ACO or part of an ACO”; 2 “Our organization is investigating options on how to become an ACO or part of an ACO”; 3 “Our organization has no intention of becoming an ACO or part of an ACO in the next 12 months” and 4 “Other”. The distributions of these responses are presented in Table 3.

Table 3- ACO status for medical practices

Description of current ACO status for organization	Freq.	Percent
1. Current in an ACO or part of an ACO	68	7.05%
2. Investigating options for an ACO or part of an ACO	414	42.90%
3. No intention of ACO participation in next 12 months	423	43.83%
4. Other	60	6.22%
Total:	965	100.00%

The respondents were evenly split between current engagement or an interest in an ACO versus no direct interest at the time of the survey (482, 49.95% vs 423, 50.05%). This provides a clean delineation between these subgroups. This response was recoded into a dichotomous variable (Q21ACO), where “1” indicated the organization was either currently engaged in an ACO or was working towards participation in the succeeding twelve months.

The variable Q21ACO becomes the dependent variable of a model to determine elements that lead groups to participation in ACOs. Responses to other questions in the survey serve as determinants of the propensity of medical practices to answer positively on this question. The influence of independent variables will be analyzed using a logistic regression model. The creation of a dichotomous independent variable requires the utilization of logistic regression to measure the effect of the independent variables on the dependent variable (Long & Freese, 2006). The dependent variable in this analysis is binary and not continuous (as defined, medical practices are either engaging towards ACO participation or they are not), and therefore a linear regression model is not

appropriate for this analysis. In the following subsections, the elements of the logistic regression model will be described, with the independent variables developed from the survey questionnaire to examine the hypotheses stated in Chapter 4.

Subsection One – Analysis variables for Hypothesis 1

Hypothesis 1 states that medical groups which have current elements that align with structural elements of ACOs will be more likely to participate in ACOs. Core structural elements for ACOs have been defined to include patient-centric decision making; a patient-centered health home to provide primary and preventive care; population and data management capabilities; an efficient provider network; an established ACO governance structure coordinating participants in the organization; and payer partnership arrangements (Foster et al., 2012; Fisher, Shortell, Kreindler, Citters, & Larson, 2012). While the MGMA survey did not explicitly develop their questionnaire based on these structural elements, there are a series of questions that develop an understanding of medical groups' degree of capacity towards these elements.

The issues of patient-centric decision making involve concerns of developing care management processes and the tracking of quality measures to determine the results of care provision. In the MGMA survey, the quality measurement process is examined with Question 10, which asks respondents about their organization's status in collecting eight different quality measures. For each quality measure such as access (waiting times), clinical processes (appropriate clinical testing), and preventive health services (influenza immunization rates), the respondents were asked to report whether their organizations currently collected data on the measure, did not but intended to collect it in the next

twelve months, had no intention to collect it in next twelve months, or did not know or was not applicable.

The second measure of patient-centric decision making involves the development of care management processes. The MGMA survey examines the care management process in Question 12, which asks respondents about their organization's status in collecting six different care management processes. These included items such as same-day access, care management of high-risk patients, and coordinate transition between providers. The survey again inquired whether the organization had the process in place, would be implementing it within twelve months, did not intend to implement the process within twelve months or did not know or was not applicable.

The structural elements of population and data management capabilities are addressed in the MGMA survey in two questions. Question 9 asks respondents to indicate the status of their organizations' information capabilities in six areas of data management, such tracking high-risk or high-needs patients, tracking clinical referrals or consultations, electronically exchanging clinical information with outside organizations, and providing patients with clinical summaries of each office visit. As with the previous measures, the responses range from current use to not applicable. Question 8 asks respondents to indicate whether their organizations utilize and electronic health record for the majority of their patients.

The final structural element assessed in the MGMA survey examines the issue of payer partner relationships. Question 16 asks respondents to indicate whether their organizations receive incentive payments from payers. The question inquires on five

types of incentive payments such as payment for compliance with quality-based process measures, payment for treatment outcomes, payment for reducing the utilization and costs of services, and payment based on patient satisfaction.

These five questions will be used as independent variables in the regression model to determine the influence of structural elements on the propensity of medical practices to engage in ACOs. Theoretically, each of these independent variables should have a significant relationship with the dependent variable.

Subsection Two – Analysis variables for Hypothesis 2

Hypothesis 2 states that medical groups which are more efficient in their medical services will be more likely to participate in ACOs. The capacity for efficiency provides these organizations with resources to adapt to new care delivery models. This relationship is well established in the literature (McClellan, McKethan, Lewis, Roski, & Fisher, 2010; Fisher et al., 2007; Casalino, Devers, Lake, et al., 2003) and has also been noted by medical trade organizations evaluating this model of care delivery (Pinnolis, 2012; Yankeelov, 2013).

While the stated goal of Section 3022 of the Patient Protection and Affordable Care Act indicates that ACOs will reduce unnecessary costs, the construct of efficiency here is based on organizations which have developed a level of efficiency that will allow them to successfully engage in payment structures that reward them for providing services at less cost than is currently being incurred in health services delivery. It is conceivable that a medical group practice might engage in an ACO as a “learning curve” to increased efficiency. However, since success in participating in an ACO is based on

efficient service provision, the suggestion here is that organizations which measure their efficiencies would be more inclined to participate in an ACO.

The MGMA survey addresses this issue in Question 11, which asks respondents to indicate whether their organization track ten different efficiency measures. These measures include internal costs, such as operating costs per FTE physician, per encounter, per patient, or per work RVU, costs from the payer perspective for total costs or costs per episode, and other efficiency measures such as staff production measures. As noted above, respondents were asked to indicate whether the organization currently tracked these measures, intended to do so in the next twelve months, did not intend to do so, or did not know or was not applicable.

Additionally, Question 7 of the survey asked respondents to indicate the degree of challenge their organization faced in becoming successful in various aspects of change. Among the thirteen items listed, several were related to organizational efficiencies such as reducing internal operating costs, reducing total costs of care to the payer, creating effective data sharing relationships with payers, and committing resources to start and sustain changes. These items will be examined to determine if there is a pattern of similar response that would reflect organizational concern with efficiencies. Again, it is expected that each of these independent variables should have a significant relationship with the dependent variable.

Subsection Three – Analysis variables for Hypothesis 3

Hypothesis 3 states that medical groups will initially consider the acquisition of resources, through contractual arrangements and mergers, to engage in

services in connection with ACOs. The theory of the firm literature previously noted provides numerous examples of firm expansion through activities that allow the organization to acquire capacity it currently does not possess. The “make or buy” conundrum is clearly evident in the development of increasingly complex healthcare service delivery organizations. Health services research has followed this integration trend and notes the increasing importance of capabilities acquisition as strategy for the survival and growth of medical practices (Casalino, Devers, Lake, et al., 2003; Zajac, Golden, & Shortell, 1991; Stephen M. Shortell, 2000).

Within the framework of this current research, medical group practices need to acquire both resources and expertise to shift from fee-for-service revenue models to risk-sharing systems of managing population. One mechanism for this is to enter into joint ventures with other organizations, thus providing experience and expertise in coordinating production functions with other healthcare organizations. This mechanism indicates a contractual relationship, as opposed to being absorbed into a larger integrated delivery system. This alternate approach to integration in the healthcare sector has been examined since the rise of managed care organizations (James C. Robinson, 1997). In the MGMA survey, Question 3 asked respondents to indicate whether their organizations had created or joined a business entity, such as a joint venture, for the purpose of sharing expenses and revenues with another healthcare delivery organization.

Another element of this capacity acquisition strategy is the development of a Patient Centered Medical Home. The PCMH is a model of care which comprises the elements of an assigned personal physician for each patient who directs the ongoing care

of that patient, an orientation to the whole healthcare needs of the patient through care coordination and integration, enhanced access for patients to appropriate and timely services, and a recognition of the added value of this approach in the payments made to the provider under this system of care (Stange et al., 2010). These elements can be seen as an underlying component of the care delivery processes that ACOs will use to deliver efficient care as structured in Section 3022 of the Affordable Care Act. For physician group practices, this capacity can be either internally developed or contractually acquired.

Medical practices which are comprised exclusively of primary care physicians would be expected to create their own PCMH model utilizing the physicians within the organization and establishing new processes of care management. But with surgical specialty practices, and possibly even multispecialty practices, the development of a PCMH model can involve creating contractual relationships with primary care practices that allow for the care coordination elements stated in the definition. The PCMH model does not restrict service delivery single specialty primary care practices. Question 17 of the MGMA Survey asks respondents to indicate their organization's current PCMH status. Respondents indicated the degree to which their organization was engaged in becoming a PCMH, ranging from not being familiar with the concept to the organization being a PCMH an accredited by an external organization such as NCQA. It is anticipated that each of these independent variables will have a significant relationship with the dependent variable.

Subsection Four – Analysis variables for Hypothesis 4

Hypothesis 4 states that organizational size and complexity will be related to medical group interests in developing or participating in an ACO. The literature review presented Kralewski's findings over several research studies that demonstrated a positive correlation between group size and administrative differentiation. Question 25 of the MGMA Survey asks respondents to indicate the number of full-time physicians practicing in the medical group. Based on the research of Kralewski, as well as analysis by Berenson (2008), Casalino (2005) and Shortell (2005), it is expected that the propensity of medical groups to form an ACO will be positively correlated with the size of the organization.

However, increased organization size leads to increased complexity, with cultural differences emerging as medical groups become larger. Curoe et al. (2003) noted that become less cohesive and demonstrate less organizational identity and trust as they become larger. And while medical groups become more business oriented as they become larger, they are also less innovative. Similar findings by Nembhard et al. (2012) suggest that as groups increase in size, both group orientation and developmental cultures as less likely to emerge. These studies suggest that while size may support the development of an ACO, cultural elements within these organizations may act as constraints to this development. Two questions from the MGMA Survey will be used as independent variables to examine the effect of organizational complexity on the propensity to form an ACO.

As discussed in determining the analysis variables for Hypothesis 2, Question 7 asks respondents to indicate the degree of challenge faced by the organization to become successful in thirteen areas of organizational change. These items include the degree of the challenge in developing physician leadership, developing effective information systems, maximizing patient satisfaction, and committing the time to start and maintain changes. The question also asked about organizational challenges in resolving issues between primary care and specialty physicians, providing sufficient primary care resources, and making referrals to specialists based on cost, utilization, and quality factors. The higher the level of challenge facing the organization should be an increasing barrier to the propensity of the medical group to form an ACO, and it is expected that there would be a negative correlation between these independent variables and ACO formation.

Finally, Question 23 of the MGMA Survey specifically asked respondents to evaluate the degree of challenge facing the organization in developing an ACO when considering the aspects of: motivating physicians to participate; developing physician leadership; raising startup capital; developing a governance structure, and evaluating the costs and benefits of creating an ACO. These elements of organizational complexity are constraints to the propensity of medical groups to form ACOs, and it is expected that there will also be a negative correlation between these independent variables and ACO formation.

Section Three – Description of Methods

In addition to the creation of a dichotomous independent variable (Q21ACO, as described in Section One above), the responses to the questions which are the independent variables in the model also required certain modifications for use in the model. Those modifications are noted below, and include exploratory factor analysis, tetrachoric factor analysis, and creation of dichotomous variables and categorical variables. These methods are described below.

Subsection One – Factor Analysis

As noted above, the MGMA Survey comprised thirty-three questions, including demographic questions and organizational questions regarding readiness to engage in new healthcare delivery models. Numerous questions included multiple components that respondents rated on Likert scales. The questions selected for analysis comprised one question for the dependent variable and eleven questions for elements of the independent variables. Within these eleven independent variables, there were a total of fifty-six response categories. For example, Question 16 examined payer incentives, and asked respondents to indicate whether the organization had received incentives for the each of the following: payment for compliance with quality-based process measures; payment based on treatment outcomes; payment based on reducing utilization of healthcare services; payment based on reducing the total cost of care to the payer; and payment based on the patient's care experience. To examine the effect of incentive payments on the propensity to form ACOs (Hypothesis 1), it would be useful to combine these

responses together if there is a commonality in how respondents answered these questions.

Exploratory factor analysis is used to reduce the number of variables included in the model to a smaller number of factors (Fabrigar, Wegener, MacCallum, & Strahan, 1999). There are research guidelines that inform the use of this technique and each of them have been considered in this research project. First, each factor should be developed from at least four variables, and preferably six. In the factor analyses discussed below, each factor analysis was conducted using at least five variables. The authors also suggest that the commonality (matrix correlation) of the variables in analysis should be preferably .70 or higher. However, with moderate communalities (.40 to .70), a sample size of 200 is advised, with a preference for a sample size of 400 or more. The MGMA Survey data set has 965 responses. Second, exploratory factor analysis is the preferred methodology of choice when seeking latent constructs that are not available a priori. This is the case with the questions in the MGMA survey and their relation to the hypothetical model being developed for ACO engagement.

Third, the maximum likelihood (ML) methodology of model-fitting is the preferred technique to create the underlying factors. This methodology has been executed in Stata version 13 to derive the relevant factors. Fourth, in determining the number of factors, both scree test and examination of eigenvalues should be utilized. These analyses were included in the factor analysis procedures. And fifth, the solution should include an orthogonal varimax rotation of the identified factors to maximize the

variable analysis, which was performed as a component of the factor analyses of the data set.

The questions from the MGMA survey that included multiple components such as Question 16 were examined to determine if there were underlying factors that explained the responses more parsimoniously. The factor analyses were conducted using Stata IC, Version 13. In accordance with established research analysis protocols (Hutcheson & Sofroniou, 1999; Kline, 1994). For the purposes of determining an underlying factor, the following criteria were applied to the analysis:

1. **Correlation matrix** – Each question with multiple dimensions was examined through correlation matrices for a pattern of interrelatedness.
2. **Cronbach's alpha** – Each question with multiple dimensions was measured for correlation using Cronbach's alpha (Cortina, 1993) to determine the degree interrelatedness of the expanded inquires for each question. The criteria used for this research is a minimum scale reliability of .60 to proceed to factor analysis.
3. **Factor analysis** – Assuming sufficient scale reliability, each group of responses were examined through factor analysis using the principal-component factors methodology to determine the underlying factors the survey questions measured (Jolliffe, 2005).
4. **Retained factors** – Based on the output from Stata, with orthogonal varimax rotation, the factors with Eigen values of 1.0 or greater were retained (Fabrigar et al., 1999).

- 5. Construct validity** – The retained factors were examined for construct validity, and based on the logic of an underlying explanatory factor, a new variable was created with a name that was descriptive of the factor represented in the combined variable responses.
- 6. Tetrachoric analysis** – In those instances where the variable responses were dichotomous as opposed to continuous or categorical, the use of factor analysis is not appropriate. For those variables, the determination of common underlying factors was performed using tetrachoric correlation coefficient analysis (Uebersax, 2006; “Stata FAQ: How can I compute tetrachoric correlations in Stata?,” n.d.). This procedure creates a retained correlation matrix of the dichotomous variables, and then performs a factor analysis on the matrix. The resulting output is analyzed and interpreted in the same manner as the factor analysis of continuous variables.

The following questions were analyzed through factor analysis to determine underlying constructs that more generally described the responses solicited in the survey.

Question 7 – What is the degree of challenge your organization faces in becoming successful in the following aspects of change?

This question asked respondents to rate their response on a continuous scale from “0”: Unknown/Not applicable to “5”: Extreme challenge. Components of this question (Q07A – Q07M) included the following challenges:

- A. Developing physician leadership
- B. Reducing clinical variation

- C. Developing effective clinical and management information systems
- D. Creating effective data sharing with payers
- E. Developing and maintaining a common clinical culture
- F. Aligning incentives to encourage provider productivity while minimizing unnecessary utilization of services
- G. Reducing internal operating costs
- H. Reducing total costs to the payer (including physician, hospital, surgery, imaging, lab, drug, rehab, etc. costs)
- I. Maximizing patient satisfaction
- J. Providing sufficient primary care resources
- K. Resolving issues between primary care and specialty physicians
- L. Making referrals to specialists based upon cost, utilization and quality factors
- M. Committing the time to start and sustain changes

Factor analysis of these questions revealed three factors which on rotation cumulatively explained .5531 of the variance of these responses. The continuous variables that were created from these factors were these summed responses:

1. **GroupAlignChal** – A variable that combines the responses to questions Q07A – Q07C, Q07E, and Q07I, and describes the challenges facing medical groups to internally align the organization to deal with the external challenges facing the organization.

2. **CostConcernChal** - A variable that combines the responses to questions Q07D, Q07G, Q07H, and Q07M, and describes the challenge of medical groups to effectively manage costs.
3. **PriSpecChal** – A variable that combines the response to questions Q07J – Q07L, and describes the challenges of medical groups to resolve differences between primary care physicians and specialist physicians within the group.

Question 9 – What is the status of your organization’s information system capabilities in each of the following areas?

This question asked respondents to indicate if they had the current capability, did not currently have but intended to have in the next twelve months, had no plans to have this in the next twelve months or did not know or not applicable on the following elements of information systems capabilities:

- A. Target high-risk or high-needs patients at risk of hospitalization (e.g., predictive modeling)
- B. Track clinical referrals or consultations (e.g., referral tracking system)
- C. Electronically exchange clinical information with physicians and hospitals outside your organization
- D. Monitor chronic diseases (e.g., asthma, diabetes) through a disease registry
- E. Provide patients with a clinical summary of each office visit
- F. Evaluate our provider performance relative to benchmarks.

The responses to each component of question 9 were recoded to “0”: Do not know/Not applicable and No plans in next twelve months or “1”: Intend to have in next twelve months/currently have this capability. Tetrachoric factor analysis was performed, suggesting one explanatory factor, with a cumulative proportion of explained variance of these questions at .6398. The variable that was created from the summed values of Q09A – Q09F was **ManageClinInfo**, which describes the ability of medical groups to manage clinical information necessary to participate in emerging care delivery systems such as ACOs.

Question 10 – Does your organization collect the following quality measures?

This question asked the respondents to indicate in the same manner as question 9 if the organization collected information on these quality measures:

- A. Access measures (e.g., waiting times, third next available appointment)
- B. Process measures (e.g., A1c testing 2 times annually)
- C. Clinical outcome measures (e.g., A1c in poor control)
- D. Patient experience measures (e.g., patient satisfaction survey)
- E. Patient safety measures (e.g., patient falls, catheter-associated UTI)
- F. Preventive health measures (e.g., influenza immunization rate, blood pressure measurement)
- G. Utilization measures (e.g., 30-day hospital readmissions, emergency room use)

H. Patient reported health outcome measures (e.g., SF 12 health status questionnaire)

The responses were again recoded as “0” or “1”, and tetrachoric factor analysis was performed. One explanatory factor emerged, with a cumulative proportion of explained variance of these questions at .6822. The variable that was created from the summed values of Q10A – Q10H was **QualMeas**, which describes the ability of medical groups to manage the quality measures necessary to participate in emerging care delivery systems such as ACOs.

Question 11 – Does your organization track the following efficiency measures?

This question asked the respondents to indicate in the same manner as question 9 if the organization collected information on these quality measures:

- A. Practice operating cost per full-time equivalent (FTE) physician
- B. Practice operating costs per encounter
- C. Practice operating cost per procedure
- D. Practice operating cost per patient
- E. Practice operating cost per work RVU
- F. Total costs per patient from the payer’s perspective (including physician, hospital, surgery, imaging, lab, drug, rehab, etc. costs)
- G. Total cost of an episode of care from the payer’s perspective
- H. Works RVUs per provider
- I. Staff production measures (e.g., postings per billing employee)

J. Business office operations measures (e.g., collection percentage, days in A/R)

The responses were again recoded as “0” or “1”, and tetrachoric factor analysis was performed. In this analysis, two underlying factors were revealed, with a cumulative explained proportion of .7695 of the variance after rotation. However, in this solution, both Q11E (practice costs per work RVU) and Q11H (work RVUs per provider) loaded on both factors, suggesting the presence of a 3-factor solution, with this third factor capturing the importance of measuring costs in a standard fashion, whether for internal purposes or reporting to external stakeholders such as payers. Questions Q11A – Q11H were recoded as “0”: Does not currently have this capacity or “1”: Currently tracks these efficiency measures. The tetrachoric analysis was again performed, and a 3-factor solution emerged that explained a cumulative proportion of .8188 of the common variance. Based on these results, the following variables were created to measure the factors surfaced:

1. **TrackOperCosts** – A variable that combines the responses to questions Q11A – Q11D and measures the organization’s current capacity to track internal operating costs.
2. **TrackPayerCost** – A variable that combines the responses to questions Q11F and Q11G, and measures the organization’s current capacity to track costs from the perspective of third-party payers.

3. **TrackEffMeas** – A variable that combines the responses to questions Q11E Q11H – Q11J, and measures the organization’s current capacity to track internal operational efficiency measures.

Question 12 – What is the status of the following care management processes in your organization?

This question asked the respondents to indicate in the same manner as question 9 if the organization collected information on these care management measures:

- A. Allow patients to access a provider the same day or when the practice is closed without going to an emergency room or urgent care clinic
- B. Provide for care management for high-risk patients
- C. Follow up with patient/family who has not kept appointments
- D. Ensure that transition from one provider to another is planned, coordinated and documented
- E. Utilize care protocols/pathways
- F. Provide patient education and support

The responses were again recoded as “0” or “1”, and tetrachoric factor analysis was performed. One explanatory factor emerged, with a cumulative proportion of explained variance of these questions at .6421. The variable that was created from the summed values of Q12A – Q12F was **CareManage**, which describes the development of care management processes by medical groups, which is a key component of managing population health in ACO delivery systems.

Question 16 – Does your organization receive the following incentive form payers?

This question asked the respondents to indicate either “1”: Yes, “2”: No, or “3”:

Do not know/Not applicable to these types of incentive payments:

- A. Payment for compliance with quality-based process measures (e.g., reporting percent of diabetic patients with A1c greater than 9.0)
- B. Payment based on treatment outcomes (e.g., % of diabetics whose A1c decreased in the past year)
- C. Payment based on reducing utilization of healthcare services (e.g., non-urgent emergency room visits, diagnostic imaging)
- D. Payment based on reducing the total cost of care to the payer (e.g., shared savings)
- E. Payment based on the patient’s care experience (e.g., patient satisfaction)

The responses were recoded as “0”: No (for “2” or “3” above) or “1”: Yes, and tetrachoric factor analysis was performed. One explanatory factor emerged, with a cumulative proportion of explained variance of these questions at .7748. The variable that was created from the summed values of Q16A – Q16E was **PayerIncentPymnts**, which describes medical group’s experience in organizing and documenting care delivery to receive incentive payments from payer. This shift from traditional fee-for-service payments is an indication that the medical group has the potential to participate in cost-

savings and cost-sharing payment systems such the bonus payments available through ACOs.

Question 23 – Regardless of your current ACO status, what do you feel is the degree of challenge for the following aspects of establishing an ACO?

Similar to Question 7, this question asked respondents to rate their response on a continuous scale from “0”: Unknown/Not applicable to “5”: Extreme challenge.

Components of this question (Q23A – Q23E) included the following challenges:

- A. Motivating physicians to participate
- B. Developing physician leadership
- C. Raising startup capital
- D. Developing a governance structure
- E. Evaluating the costs and benefits

These components had a high Cronbach’s alpha (.9060), and one factor emerged in factor analysis that had a cumulative explanation of explained variance of .7292. The continuous variable created from these components was **ACODevChal**, which is a measure of the perceived difficulty for the medical group to establish an ACO across several elements of organizational development.

Subsection Two – Variable recoding

In addition to the factor analysis performed on seven questions from the MGMA Survey in the development of independent variables in the model, four additional variables were recoded to create independent variables, and two were recoded to create dummy variables. The recoded independent variables are:

Question 3 – Has your organization created or joined a business entity, such as a joint venture, for the purposes of sharing expenses and revenues with another delivery organization?

This question asked respondents to indicate if the medical group had entered into a relationship with one or more hospitals, with one or more medical practices, with one or more hospitals AND one or more medical practices; with another type of medical organization; no or do not know/not applicable. The responses were recoded as “1”: Yes if the responded entered any of the first four responses listed, and “0”: No if either of the last two responses were selected. The dichotomous independent variable created was **JointVen**, and indicates whether the medical practice has participated in a joint venture. This is an indicator of the organization’s capacity to enter into larger care delivery systems such as ACOs.

Question 8 – Does your organization currently use an electronic health record (EHR) for the majority of your patients?

Responses to this question were either Yes, No, or Do Not Know/Not Applicable. The responses were recoded “1”: Yes, “2”: No or Do Not Know/Not Applicable. A new dichotomous variable **EHR** was generated to measure the organization’s use of electronic health records.

Question 17 – Which of the following best describes your organization’s current PCMH status?

This question asked respondents to indicate the organization’s degree of engagement in Patient Centered Medical Homes, with responses ranging from not being

familiar with the concept to being an accredited PCMH. This variable as recoded as “0”: No if the respondents indicated no current PCMH activity, and “1”: Yes if the organization was engaged in PCMH activity. Additionally, sixty-nine respondents indicated “Other”. There was a free-text follow-up Question 17T which allowed for comments. These were examined, and based on these nine responses were recoded as engaging in PCMH activity. A new dichotomous variable **PCMH** was generated to measure the degree to Patient Centered Medical Home engagement among the respondents.

Question 25 – How many full-time equivalent (FTE) physicians work for your organization?

This question was recoded as a categorical variable, with the following categories: “1” for groups of 3 to 5 physicians, “2” for 6 - 10, “3” for 11- 25, “4” for 26 to 50, and “5” for 51 or more physicians. As noted previously, respondents indicating less than 3 physicians (N= 126) were dropped from the sample.

In addition to these independent variables, two control variables were recoded to create categorical variables that could be used to examine the ACO propensity model based on both different organization types (ownership) and different specialty compositions of the medical group (practice type). Those variables were based on these questions:

Question 1 – Which of the following best describes your organization?

This question asked respondents to indicate which of fourteen different types of organization structure best described the medical practice, including ownership models

such as physician-owned medical practice, hospital-owned medical practice, medical school faculty plan, urgent care center, Federally Qualified Health Center, etc. For purposes of this research, the responses were recoded into four categories that best describe the ownership model of the medical practice. A recoded categorical variable, **OrgType**, denoted the responses as “1”: Physician-owned medical practice, “2”: Hospital-owned medical practice, “3”: Medical school faculty plan, or “4” Other organization-owned medical practice. This control variable will be examined in separate regressions subsequent to the full regression model to examine the effect of organization type on the predictor variables of ACO participation.

Question 24 – Which of the following best describes your practice specialty?

This question asked respondents to indicate which specialty best described the medical practice. The question provided seventy-five categorical responses. These responses included broad categories such as multi-specialty group practice with primary and specialty care, primary care only, specialty care only, and numerous specific subspecialties of medicine and surgery. A recoded categorical variable, **PracType**, was generated to combine the responses into broad categories describing the specialty composition of the respondent’s medical groups. The responses were recoded “1”: Multispecialty group (primary & surgical care), “2”: Primary Care (such as internal medicine, family practice, pediatrics), and “3”: Surgical Care. Similar to the variable **OrgType**, this control variable will be examined in separate regressions subsequent to the full regression model to examine the effect of organization type on the predictor variables of ACO participation

Subsection Three – Logistic Regression Model

The data from the MGMA Evolving Health Care Environment Survey will be analyzed in a logistic regression model to test the hypotheses of organizational elements that would support the propensity of medical group practices to engage in ACOs. As previously noted, the dependent variable in the model is the recoded question 21 (Q21ACO), a dichotomous variable that indicates medical group practice engagements in ACOs.

This logistic regression model will produce the log-odds of the independent variables in increasing the likelihood that the medical group will pursue ACO engagement. The model of logistic regression is well-developed as a methodology to examine the relationship of independent variable on a the outcome of a binary or dichotomous variable (Hosmer, 2013). In this research, the analysis will utilize the logistic command to determine odds ratios of the independent variables. This will allow for an examination and interpretation of the important of each independent variable, was well as considering the variables grouped by hypothesis. For the purposes of this research, the general model of analysis can be represented as:

$$\hat{p} = \frac{\exp(b_0 + b_1X_1 + b_2X_2 + \cdots + b_{15}X_{15})}{1 + \exp(b_0 + b_1X_1 + b_2X_2 + \cdots + b_{15}X_{15})}$$

In this model, \hat{p} represents the expected probability that the response to Q21ACO is “1” (medical groups pursuing ACO engagement). X1 through X15 are the distinct independent variables previously presented, and b0 through b15 are the regression coefficients. The independent variables which will be examined to determine

the factors influencing medical group ACO participation in this model are grouped by hypothesis and presented in Table 4 below:

Table 4 - Independent Variables by Hypothesis

Hypothesis	Notation	Independent Variable
ONE:	X ₁	ManageClinInfo
(Structural elements	X ₂	QualMeas
of groups leading	X ₃	CareManage
to ACO formation)	X ₄	PayerIncentPymts
	X ₅	EHR
TWO:	X ₆	CostConcernChal
(Efficiency of groups	X ₇	TrackOperCost
leading to ACO	X ₈	TrackPayerCost
formation)	X ₉	TrackEffMeas
THREE:		
(Contracts & mergers	X ₁₀	JointVen
to ACO formation)	X ₁₁	PCMH
FOUR:	X ₁₂	Q25FTE
(Size and complexity	X ₁₃	GroupAlignChal
Relates to medical	X ₁₄	PriSpecChal
group ACO formation)	X ₁₅	ACODevChal
CONTROLS:		
Organization Type		OrgType
Medical Practice Type		PracType

In addition to the analysis of the general model, the model will be controlled in for type of medical group organization type (OrgType) and medical specialty composition (PracType) to examine the effects of these on the predictor variables.

CHAPTER SIX: REGRESSION ANALYSIS FINDINGS

This chapter presents the analysis of the logistic regression model previously developed as applied the dataset from the Evolving Health Care Environment Survey. The initial results are described, and the model is tested for its robustness through post-estimation commands. The results are examined against the hypotheses developed in Chapter and are additionally constrained against medical group practice types and organization type.

Section One – Model and Initial Results

As previously described, the model examines the propensity of medical group practices to engage in ACOs (variable Q21ACO) based on organizational, operational, and environmental factors developed from the MGMA survey. A summary of these independent variables utilized in the model is presented in Table 5 below. The independent variables can be classified as dichotomous (CareManage, PayerIncentPymts, EHR, JointVen, and PCMH), continuous (ManageClinInfo, QualMeas, CostConcernChal, TrackOperCost, TrackPayerCost, GroupAlignChal, PriSpecChal, and ACODevChal), or categorical (Q25FTE).

Table 5 - Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
ManageClinInfo	965	4.128497	1.817979	0	6
QualMeas	965	5.236269	2.540978	0	8
CareManage	963	0.773295	0.2576686	0	1
PayerIncentPymts	963	0.177778	0.2721659	0	1
EHR	962	0.686071	0.4643294	0	1
CostConcernChal	965	13.12539	3.374887	0	20
TrackOperCost	965	1.926425	1.566565	0	4
TrackPayerCost	965	0.255959	0.6176671	0	2
TrackEffMeas	965	2.326425	1.249969	0	4
JointVen	965	0.24456	0.4300487	0	1
PCMH	965	0.251814	0.4342797	0	1
Q25FTE	965	2.674611	1.411213	1	5
GroupAlignChal	965	14.88601	4.147871	0	25
PriSpecChal	965	6.540933	3.472421	0	15
ACODevChal	957	3.702612	1.143157	0	5

This analysis was performed using Stata® statistical analysis software, version 13/IC. The command line in Stata to create the odds-ratio logistic regression is:

```
“logistic Q21ACO ManageClinInfo QualMeas CareManage PayerIncentPymts EHR CostConcernChal
TrackOperCost TrackPayerCost TrackEffMeas JointVen PCMH Q25FTE GroupAlignChal PriSpecChal
ACODevChal”
```

This produced following odds ratio of the effects of the independent variables on the likelihood of medical groups engaging in ACOs:

Table 6 - Logistic Regression Main Model

Logistic regression		Number of obs	=	954		
		LR chi2(15)	=	181.63		
		Prob > chi2	=	0		
Log likelihood = -570.44496		Pseudo R2	=	0.1373		
Q21ACO	Odds Ratio	Std. Err.	z	P>z	[95% Conf.	Interval]
ManageClinInfo	1.150557	0.0585518	2.76	0.006	1.041335	1.271235
QualMeas	1.071871	0.0418621	1.78	0.076	0.9928847	1.157142
CareManage	1.329365	0.4637219	0.82	0.414	0.6709958	2.633714
PayerIncentPymts	1.490241	0.4412106	1.35	0.178	0.8341503	2.662373
EHR	1.013538	0.1620843	0.08	0.933	0.7408261	1.386639
CostConcernChal	0.9808865	0.0266619	-0.71	0.478	0.9299977	1.03456
TrackOperCost	0.9978782	0.0544254	-0.04	0.969	0.8967101	1.11046
TrackPayerCost	1.110627	0.1480737	0.79	0.431	0.8552288	1.442295
TrackEffMeas	1.012006	0.0697423	0.17	0.863	0.8841428	1.158359
JointVen	1.453883	0.2574758	2.11	0.035	1.027509	2.057185
PCMH	1.722332	0.3325534	2.82	0.005	1.179679	2.514603
Q25FTE	1.348827	0.0814661	4.95	0.000	1.198245	1.518332
GroupAlignChal	1.021194	0.0224222	0.96	0.339	0.9781792	1.0661
PriSpecChal	1.034266	0.0254083	1.37	0.170	0.985646	1.085283
ACODevChal	0.924325	0.0615648	-1.18	0.237	0.8112044	1.05322
_cons	0.1012703	0.0457691	-5.07	0.000	0.041762	0.2455739

This logistic model analyzes 954 observations of the dataset. The p-value of .0000 associated with the fifteen degrees of freedom in this model indicates that the overall model is statistically significant. Unlike linear regression models, the Pseudo-R² value cannot be interpreted as an explanation of variance or goodness-of-fit of the model in describing the relationship between the independent variables and the dependent

variable (Long & Freese, 2006). However, other measures can be employed, and will be developed in the next section in a discussion of diagnostics of the model.

Section Two – Logistic Regression Diagnostics

When developing a logit model of data, an important consideration is whether the model has been properly specified. There are two items to be analyzed to determine the appropriateness of the model. First is the link between the dependent variable (Q21ACO) and the independent variables in the model. Second is the inclusion of all relevant variables in the model, combined with not including any variables that should not be in the model, and that the logit function is a linear combination of the predictors. If this is not the case, a specification error in the model may have occurred. The Stata test for specification error is the command “linktest”. If a model is correctly specified, this should not find any other predictor variables that are statistically significant, except by chance. Linktest uses the linear predicted value (`_hat`) and the linear predicted value squared (`_hatsq`) to rebuild the model. If the model is properly specified by the independent variables, the value for `_hat` should be significant. This result indicates that the model is correctly specified. Additionally, the variable `_hatsq` should not have much predictive power except by change, and its value should not be significant in a properly specified model. The results of linktest are produced below, and indicate that the model is properly specified, with no additional variables providing statistically significant determination of the values for the dependent variables.

Table 7 - Linktest Model Specification Diagnostic

Logistic regression		Number of obs	=	954		
		LR chi2(2)	=	182.27		
		Prob > chi2	=	0.0000		
Log likelihood = -570.12494		Pseudo R2	=	0.1378		
Q21ACO	Coef.	Std. Err.	z	P>z	[95% Conf.	Interval]
_hat	0.9870317	0.0855317	11.54	0.000	0.8193926	1.154671
_hatsq	0.0611267	0.0767183	0.80	0.426	-0.0892383	0.2114918
_cons	-0.0447521	0.0907713	-0.49	0.622	-0.2226606	0.1331565

The next diagnostic test is an examination of the goodness-of fit of the logistic model for the data being examined. The Hosmer and Lemeshow's test examines the degree to which the predicted response frequencies and expected frequencies match closely, with the better the expected frequencies matching, the stronger the fit of the model (Hosmer, 2013). Using the Stata command "lfit", the statistic is computed as the Pearson chi-square from a contingency table of observed frequencies and expected frequencies, with a good fit indicated by a high p-value. Combining the predictor variables into five groups and creating a contingency table of 2 by 10 created the following results:

Table 8 - Goodness-of-Fit

number of observations = 954						
number of groups = 10						
Hosmer-Lemeshow chi2(8) = 5.22						
Prob > chi2 = 0.7342						
(Table collapsed on quantiles of estimated probabilities)						
Group	Prob	Obs_1	Exp_1	Obs_0	Exp_0	Total
1	0.2320	21	17.8	75	78.2	96
2	0.2994	24	25.2	71	69.8	95
3	0.3562	29	31.6	67	64.4	96
4	0.4150	36	36.6	59	58.4	95
5	0.4718	42	42.1	53	52.9	95
6	0.5437	54	48.7	52	47.3	96
7	0.6258	51	55.5	44	39.5	95
8	0.7074	59	63.8	37	32.2	96
9	0.8177	76	72.6	19	22.4	95
10	0.9427	84	82.2	11	12.8	95

The p-value of .73 indicates that the developed model fits the data well. The Homer and Lemeshow test is sensitive to the number of groups, with the 2 by 10 grouping the most common application. Using other matrix groups did not change the conclusion of a good fit for the data.

The Stata command “fitstat” is used to both examine various measures of fit of the model and to compare the fit of one model of the data to a subsequent model. For the purposes of this exploratory research, a more parsimonious model can be developed through the use of stepwise regression. Stepwise regression is a methodology to create a predictive model, but is only appropriate if the underlying construct is determined to be

valid. Based on the regression diagnostic tests performed above, the model of ACO participation has validity based on the specified predictive variables.

To create a more parsimonious model, a stepwise regression was performed that retained variables with a significance level of .10 or greater ($p > 0.10$). The use of a 0.10 level of significance was chosen to provide an exploratory model that broadly presented the important medical group elements in ACO participation, as opposed to a predictive model where a significance level of 0.05 or 0.01 might be more applicable. The stepwise regression model produced the following results:

Table 9 - Stepwise Logistic Regression Model

Logistic regression		Number of obs	=	954		
		LR chi2(6)	=	175.40		
		Prob > chi2	=	0.0000		
Log likelihood = -573.55829		Pseudo R2	=	0.1326		
Q21ACO	Odds Ratio	Std. Err.	z	P>z	[95% Conf.	Interval]
ManageClinInfo	1.163768	0.0567434	3.11	0.002	1.057702	1.280471
QualMeas	1.101569	0.0392741	2.71	0.007	1.027221	1.181298
JointVen	1.533538	0.266133	2.46	0.014	1.091379	2.154833
PayerIncentPymts	1.648788	0.4766086	1.73	0.084	0.935646	2.905483
PCMH	1.855149	0.3494495	3.28	0.001	1.282449	2.683597
Q25FTE	1.358612	0.0761805	5.47	0.000	1.217214	1.516437
_cons	0.1020621	0.0243921	-9.55	0.000	0.0638901	0.16304

The model is reduced from fifteen predictor variables to six predictor variables. However, the regression diagnostic test “fitstat” indicates that this is an improved fit of the predictor variables to the outcome values, when evaluated through the statistics Akaike

Information Criterion (AIC) and Bayesian Information Criterion (BIC). Comparing measures of fit of the original model with the results of the stepwise regression, it was determined that this is an improved fit of the data. The results are presented below, and the difference of 11.773 in AIC and 55.519 in BIC (as used by Stata) provide very strong support for the current model.

Table 10 - Measures of fit for logistic of Q21ACO

Model:	Current logistic	Saved logistic	Difference
N:	954	954	0
Log-Lik Intercept Only	-661.26	-661.26	0
Log-Lik Full Model	-573.558	-570.445	-3.113
D	1147.117(947)	1140.890(938)	6.227(9)
LR	175.404(6)	181.631(15)	6.227(9)
Prob > LR	0	0	0.717
McFadden's R2	0.133	0.137	-0.005
McFadden's Adj R2	0.122	0.113	0.009
ML (Cox-Snell) R2	0.168	0.173	-0.005
Cragg-Uhler(Nagelkerke) R2	0.224	0.231	-0.007
McKelvey & Zavoina's R2	0.224	0.231	-0.007
Efron's R2	0.171	0.177	-0.006
Variance of y*	4.239	4.275	-0.037
Variance of error	3.29	3.29	0.000
Count R2	0.671	0.68	-0.009
Adj Count R2	0.34	0.359	-0.019
AIC	1.217	1.229	-0.012
AIC*n	1161.117	1172.89	-11.773
BIC	-5349.932	-5294.413	-55.519
BIC'	-134.24	-78.721	-55.519
BIC used by Stata	1195.141	1250.661	-55.519
AIC used by Stata	1161.117	1172.89	-11.773

A final logistic regression diagnostic on this reduced predictor model examines the ability of the model to properly classify results compared to predicted results. The classification table produced below indicates that the model has predictive value.

Table 11 - Classification Table for Q21ACO responses

Classified	D	~D	Total
+	306	144	450
-	170	334	504
Total	476	478	954
Classified + if predicted $\Pr(D) \geq .5$			
True D defined as Q21ACO != 0			
Sensitivity	$\Pr(+ D)$	64.29%	
Specificity	$\Pr(- \sim D)$	69.87%	
Positive predictive value	$\Pr(D +)$	68.00%	
Negative predictive value	$\Pr(\sim D -)$	66.27%	
False + rate for true ~D	$\Pr(+ \sim D)$	30.13%	
False - rate for true D	$\Pr(- D)$	35.71%	
False + rate for classified +	$\Pr(\sim D +)$	32.00%	
False - rate for classified -	$\Pr(D -)$	33.73%	
Correctly classified		67.09%	

Based on the above diagnostic analysis, the model developed appears to be a good fit of the predictor variables to the determination of medical group participation in ACOs. The next section examines the results of the regression analysis to determine the degree of support for the hypotheses developed regarding factors that would predict participation in ACOs.

Section Three – Examination of Hypotheses

Hypothesis 1 considered the relationship between the existence of structural elements within medical groups and the interest of those groups to engage in ACOs. To analyze this relationship, the variables of managing clinical information, collecting data

on quality measures, using care management processes, experience with payer incentive payments, and the use of an electronic medical record system were examined to determine the degree to which the structural elements of medical groups align with the components of ACOs.

Of the five variables (ManageClinInfo, QualMeas, CareManage, PayerIncentPymts, and EHR), the three variables of managing clinical information, collecting data on quality measures, and experience with payer incentive payments were positively significantly associated with participation in an ACO:

Table 12 - Hypothesis 1 significant variables ($p > 0.10$)

Q21ACO	Odds Ratio	Std. Err.	z	P>z	[95% Conf.	Interval]
ManageClinInfo	1.163768	0.0567434	3.11	0.002	1.057702	1.280471
QualMeas	1.101569	0.0392741	2.71	0.007	1.027221	1.181298
PayerIncentPymts	1.648788	0.4766086	1.73	0.084	0.935646	2.905483

Two of these variables demonstrate a high level of predictive significance ($p > .05$), and PayerIncentPymts exhibits significance using the 10% threshold. The ability of medical groups to manage clinical information appears well-developed among respondents to the survey. On the six measures of utilizing the organization's information system to collect actionable clinical data that were combined into this variable, over fifty percent of respondents were using information systems to report on five or more clinical measurements. The literature describing previous attempts to

develop integrated delivery systems in the mid-1990's indicates that strategic organizations would utilize information systems as one factor in integration (S. M. Shortell, Gillies, & Anderson, 1994), and this finding supports that strategy.

Similarly, the capture of data to measure the quality of care provided is also active among these respondents. In this instance, over fifty-three percent of medical groups were capturing six of eight quality measures listed in the survey. The type of quality measures included in this variable ranged from simple access measures such as waiting times to more complex measures such as patient reported health outcome measures. As expected a large number of respondents either currently or planned to capture access information (74.43%). Interestingly, a majority of respondents currently were, or planned to, capture utilization measures such as hospital readmissions, and a large number (46.58%) were working to capture patient outcome measures, such as using an SF 12 Health Status Questionnaire ("A 12-Item Short-Form Health Survey," n.d.)

The CareManage variable was not a significant predictor in the model. This variable combined response on the processes of care; such as care management of high-risk patients, documenting transfers of care, and allowing access to care without sending patients to emergency rooms or urgent care clinics. While a large majority of respondents were engaged in at least four of the processes (79.17%), this was not a significant predictor of ACO participation. It may be the case that care management protocols are prevalent for medical groups due to contractual obligations with managed care companies. As such, these processes are not new organizational elements that align with a changed environment based on the emergence of ACOs but rather a factor of

strategic response in an existing environment as described by Michael Porter's Five Forces Model (Porter, 1998).

The PayerIncentPymts variable summed responses of medical groups in receiving incentive payments across multiple components of medical care, including compliance with quality measures, care outcomes, cost savings, and patient satisfaction. The descriptive statistics for this variable reveals that a majority of the respondents (58.98%) had not received any of the five different types of incentive payments from payers. However, the finding of significance at the 10% level in the model is not surprising, in that a core component of the ACO model is a payment for the shared savings achieved through effective management of the ACO population. The development of physician incentive payments from payer organizations is both well-established and well documented in the literature (James C. Robinson, 2001; Rosenthal MB, Frank RG, Li Z, & Epstein AM, 2005). For those groups which have some degree of prior experience, it follows that these groups would be prepared to engage in an environment that emphasizes other measures of performance in revenue structures.

Finally, the variable EHR, which reports whether medical groups use an electronic health record for the majority of their patients, was not a significant predictor of ACO participation. The summary statistics of this variable reveal that about one-third of practices (31.39%) did not use an EHR for the majority of their patients in 2011, when this survey was conducted. This is generally in line with findings of the National Center for Health Statistics, which has extracted office-based physician EHR use from the National Ambulatory Medical Care Survey (C.-J. Hsiao & Hing, 2014). Physician

practice utilization of any EHR system has risen from eighteen percent of office-based physicians in 2001 to approximately seventy-eight percent in 2013. The use of a basic system that meets meaningful use criteria as defined in the Health Information Technology for Economic and Clinical Health (HITECH) Act of 2009 has risen from ten percent of office-based physicians in 2006 to forty-eight percent in 2013. While the adoption of electronic health records is a response to an external environmental stimulus (differential payments for Medicare and Medicaid services based on meeting adoption criteria), medical groups are not adopting this technology as a strategic component of participation in ACOs.

Hypothesis 2 considered the relationship between the efficiency of medical groups in the production of medical services and the interest of those groups to participate in ACOs. To analyze this relationship, three factor variables examining organization's ability to track internal costs, costs from the payer perspective and internal efficiency measures were examined along with the organization's cost concern challenges were examined to determine the degree to which the structural elements of medical groups align with the components of ACOs. The three tracking variables were developed from a factor analysis of responses to Question 11 of the MGMA Survey, which asked respondents to indicate whether the organization currently did or planned to track various efficiency measures. The factor of cost concern challenges was extracted from Question 7, which asked respondents the degree of challenge the organization faced on several aspects of change.

For each of the four variables (CostConcernChal, TrackOperCost, TrackPayerCost, and TrackEffMeas), there was not a significant relationship with the dependent variable of ACO participation. The odds ratios were positive for tracking payer costs and tracking efficiency measures, and negative for cost concern challenges. These findings are consistent with expectations, although the variable of tracking operating costs had a negative odds ratio, which does not align with expectations. There is not sufficient evidence in these findings to reject the assertion that there is no significant relationship between the use of tracking measures and cost concerns in the propensity of the medical groups to participate in ACOs.

These results suggest that medical groups may be entering into ACO participation as a learning opportunity. At the time of this survey, the components of financial risk in ACOs were not clearly delineated, and the initial commercial ACOs were focused on rewarding organizations for coordinated care and quality measurement activities (Foster et al., 2012). The importance of achieving savings internally might not be a consideration for pursuing an initial strategy of ACO participation. Achieving cost savings from the payer perspective is potentially a learning process which would develop from participation in ACOs, as opposed to being a prerequisite to engaging in these types of care delivery arrangements. These considerations could explain the lack of influence of the Hypothesis 2 variables on the likelihood of medical group practices to engage in ACO participation.

However, it could also be the case that medical groups do not have a strongly developed capacity to monitor production costs, either from an internal perspective or

more importantly from the perspective of payers. The payments received from third party payers in a fee-for-service environment do not have a cost-based relation to the actual expenses incurred by medical groups to provide care to their patients. When this is combined with a lack of information regarding the costs of care for services provided outside of the medical group but still a component of the care experience for the patient (e.g., the global costs for a hip replacement), the explanation of a lack of financial capacity or resources for medical groups does provide insight into these findings.

The problem with this result is that while medical group practices might not need this capacity to initially engage in ACO participation, the ACO model itself is constructed on the ability of providers to provide services with savings to the payer that is shared with the ACO organization. And there appears to be emerging evidence that medical groups have a lack of capacity in both financial tracking and health IT structures necessary to success in an ACO environment.

A recent national survey of ACOs found that the majority were physician-led, and that these developed from medical groups similar to the focus of this research (Colla, Lewis, Shortell, & Fisher, 2014). Examining the responses of 173 ACOs, the researchers found that only one-third of these organizations monitored financial performance on a comprehensive and timely basis relative to their benchmarks. While the majority of organizations surveyed reported the ability to measure and report financial performance at the practice and clinician level, this appears to be the development of internal systems that provide management information required for provider compensation. The lack of measurement and reporting of broader risk-based benchmarks echoes the findings

reported here. This pattern suggests a limitation of the potential for ACOs to achieve meaningful cost savings in the provision of care absent increased organizational capacity in financial infrastructure.

Additionally, the lack health IT infrastructure was the most frequently cited challenge to ACO implementation. Health IT capacity would be necessary to track care provision across multiple providers, and to inform the organization regarding external services (and potentially the costs) that comprise the total care received by ACO enrollees. This finding may support the lack of significance of EHR utilization as a structural element in ACO participation noted above.

Hypothesis 3 examined the acquisition of resources, through contractual arrangements and mergers, to as a mechanism to develop the necessary tools and knowledge to participate in ACOs. Two distinct variables, one focusing on external relationships and the other on organizational and operational constructs, were developed to measure this propensity to participate in ACOs. The dichotomous variable, JointVen, recorded whether the organization had entered into a joint venture, sharing expenses and revenues, with another healthcare organization. The dichotomous variable, PCMH, recorded whether the organization had developed or was working on the development of a Patient Centered Medical Home. Both of these variables were positively significantly associated with the propensity to participate in an ACO, as noted in table 13 below:

Table 13 - Hypothesis 3 significant variables (p>.10)

Q21ACO	Odds Ratio	Std. Err.	z	P>z	[95% Conf.	Interval]
PCMH	1.855149	0.3494495	3.28	0.001	1.282449	2.683597
JointVen	1.533538	0.266133	2.46	0.014	1.091379	2.154833

The highly significant p-value for the variable PCMH recognizes the importance of experience in coordination-of-patient-care models for medical groups seeking to participate in ACOs. The odds ratio suggests that experience with Patient Centered Medical Homes makes a medical group 85% more likely to engage in an ACO, holding all other variables constant. This finding is consistent with literature that suggests Patient Centered Medical Homes would function as a primary building block for the continuity of care provided across an ACO (McClellan et al., 2010; Meyers, 2010; Fisher et al., 2009). Similarly, familiarity and experience with joint ventures has been presented as a mechanism for small health provider entities to develop entrée into working with larger, more complex organizations such as integrated delivery systems (Shields et al., 2011; Audet, Kenward, Patel, & Joshi, 2012).

Hypothesis 4 states that organizational size and complexity will be related to medical group interests in developing or participating in an ACO. This relationship of organization size was examined through a categorical variable of the size of the medical group practice as measured in full-time equivalent physicians. A larger medical group organization should have greater capacity to engage in new organizational forms, and the relationship between size and ACO development should be positive. Alternately, the

issue of complexity was measured through three continuous factor variables, GroupAlignChal, PriSpecChal, and ACODevChal. These continuous variables measured the level of organizational challenges in aligning group strategic planning and environmental responses. GroupAlignChal incorporates elements such as developing physician leadership and maintaining a common culture. PriSpecChal incorporates elements such as resolving issues between primary care and specialty physicians and providing sufficient primary care resources. ACODevChal incorporates elements necessary to creating or joining an ACO, including items such as motivating physicians to participate and developing a governance structure.

These three variables are measures of barriers to development for organizations seeking to engage in an ACO, and as such should have a negative correlation with the dependent variable of ACO formation. The results of the logistic regression model indicated that only ACODevChal had a negative correlation with creating an ACO, but this was not significant. Both GroupAlignChal and PriSpecChal exhibited a positive, but not significant, correlation with the dependent variable. Complexity issues in medical group practices, as defined by the variables in this model, do not appear to create a barrier to the pursuit of an ACO strategy.

The issues of group alignment, competing priorities between specialists and primary care providers, and the organizational development challenges towards an ACO raise the question of causation. Studies examining ACO creation (Auerbach, Liu, Hussey, Lau, & Mehrotra, 2013) do report a correlation in regions with larger IDS organizations and larger medical groups. This would be the case where issues of

alignments and development challenges are overridden by organizations having sufficient capacity and resources to overcome internal barriers to develop new cooperative pathways of providing services. Increasing organizational size is generally correlated with additional slack resources (Pfeffer & Salancik, 1978), and the significance of size in the logistic regression model suggests that this factor might reduce the potential of internal organizational nonalignment in strategy development.

Additionally, while size is significant as noted below, the potential of small, non-aligned medical groups to perform on ACO-like measures has been demonstrated. Recent research examining whether IDS systems provide higher quality and lower cost care found that smaller single-specialty primary care practices out-performed IDS and larger multispecialty practices on costs of care (J. Kralewski, Dowd, Savage, & Tong, 2014). This supports the potential of groups similar to those analyzed in the MGMA respondent to adapt to a changing environment where outcomes and their associated costs become valued above volumes of output unassociated with measures of quality. Countering this assertion is the discussions by Kralewski et al (2014) that the group practices associated with IDS systems possess extensive administrative and organizational capacity, including EHR linkages to hospitals and specialists to provide a continuum of care. This finding reinforces the importance of size over organizational harmony in ACO participation.

The results of the logistic regression model for ACO participation agree with these recent studies of ACO organizations. The size of the medical group practice was positively correlated with ACO formation with a high level of significance ($p > .000$). In

general, an increase of one category of in the number of FTE physicians was associated with a 36% increase in the odds of a medical group practice developing an ACO.

However, the importance of size is more pronounced when examining the categorical response on this variable. Variable Q25FTE is categorical on group size, with the categories defined as: 1) 3 to 5 FTE physicians; 2) 6 to 10; 3) 11 to 25; 4) 26 to 50, and 5) 51 or more FTE physicians. When controlling for group size with the smallest group as the control, the following correlations emerge within the larger ACO participation model developed above:

Table 14 - Categorical variable Q25FTE

Q21ACO	Odds Ratio	Std. Err.	z	P>z	[95% Conf.	Interval]
_IQ25FTE_2	0.806628	0.1642287	-1.06	0.291	0.541214	1.202201
_IQ25FTE_3	1.901962	0.3993662	3.06	0.002	1.260288	2.870342
_IQ25FTE_4	2.191290	0.6239654	2.76	0.006	1.254070	3.828933
_IQ25FTE_5	2.747872	0.7185954	3.87	0.000	1.645883	4.587690

This result notes the importance of size. While there is no significant difference between groups of 3 to 5 physicians (the control) and the next larger groups (6 to 10), as group size increases above those levels, size is strongly significant as a predictor variable, and the odds ratio of the likelihood of ACO participation increases for each larger category of medical group size.

With predictor variable significance demonstrated beginning at category 3 (groups of 11 to 25 FTE physicians) and continuing for larger groups as compared to the control of groups of 3 -5 physicians, it appears that there may be a “tipping point” for group participation in ACOs. Certainly smaller groups will lack the internal resources to develop an ACO, but this does not prohibit them from joining with other small groups to create an ACO organization. This was the case with some early participants in the initial round of MSSP. One ACO organization, Coastal Carolina Quality Care (www.ccqhealthcare.com) was organized through the merger of numerous small primary care practices in the New Bern, NC area to form Coastal Carolina Health Care, P.A. Moreover, the ACO did not include any local or regional hospitals as components of the ACO, choosing instead to simply utilize those facilities as required to provide care.

However, the issue of size continues to be a potential barrier of ACO participation, and other mechanisms have been suggested to include these groups into ACOs. Research on small medical group practices (defined as fewer than 20 FTE physicians) found that almost one-quarter of those groups participated significantly in either an IPA or a PHO (Casalino et al., 2013). Moreover, medical group practices that did participate in these types of organizations were more likely to have either external incentives towards quality improvement through public reporting or pay-for-performance programs. These elements align with the program elements of ACOs, and the authors note that the Affordable Care Act specifies that IPAs and PHOs can qualify as ACOs. Additionally, health insurers currently include these organizations in their accountable care organization contracts for commercially insured patients. The authors conclude that

the utilization of IPA or PHO structures and contractual arrangements can serve as a bridge for smaller groups to participate in ACO structures. This arrangement would also have the benefit of making required structural elements, such as an integrated EHR, available through the larger organizations to these small groups, allowing them to acquire the necessary resources to develop ACO care processes.

Section Four – Practice Type and Organization Type

While the logistic model is robust for the overall sample, the constructs of practice type and organization type of the medical group practice may affect the predictor variables in this model. The larger model does not take into account the differing priorities and strategies that can arise from the concerns of single specialty medical practices versus multispecialty practices, as well as primary care practices versus surgical specialty practices. These practice type differences are noted in the literature as determinants of organizational responses to their environment (Casalino, Devers, Lake, et al., 2003; Nembhard et al., 2012; Grumbach, Osmond, Vranizan, Jaffe, & Bindman, 1998).

As noted in Chapter 5 above, to examine the effect of practice type, the variable PracType was developed from Question 24, with the survey respondent organizations being classified as either multispecialty group practices (N = 235), primary care group practices (N=229), or surgical specialty practices (N=482). The logistic regression analysis was executed on each subgroup, with a $p > .10$ significance threshold. The results of these regressions are compared to the main model below. Each predictor variable is listed, with the odds ratios reported where $p > .10$

Table 15 - Analysis of ACO model by Practice Type

Q21ACO	Main Model	Multispecialty	Primary Care	Surgical Specialists	Hypothesis
	(N= 954)	(N= 235)	(N=229)	(N=482)	
ManageClinInfo	1.163768***			1.184054***	1
QualMeas	1.101569***	1.244917***	1.261901****		1
CareManage				2.291965*	1
PayerIncentPymts	1.648788*				1
EHR					1
CostConcernChal				0.9413143**	2
TrackOperCost		1.247813*			2
TrackPayerCost					2
TrackEffMeas		0.6928364**			2
JointVen	1.533538**		4.035289***		3
PCMH	1.855149****	2.045806**	2.73207****		3
Q25FTE	1.358612****	2.004522****	1.28256**	1.445678****	4
GroupAlignChal					4
PriSpecChal				1.080215**	4
ACODevChal					4
_cons	0.1020621	0.0399538	0.0754217	0.1325305	
(* p < 0.10; ** p < 0.05; *** p < 0.01; **** p < 0.001)					

This comparison by practice type continues to support the importance of medical group size to the propensity to engage in an ACO, with all practice types exhibiting a significant correlation on this predictor variable. Hypothesis 1, the presence of structural elements of medical groups that align with the external environment for ACOs is supported in all subgroups. The surgical specialty groups have two significant predictors in support of this hypothesis (managing clinical information and developing care

management processes) while the multispecialty and primary care groups each have one significant predictor, the development of quality measures.

Hypothesis 2, the degree to which medical groups develop and utilize practice efficiencies continues to lack strong support within the subgroups of practice types. There is no significant correlation on any of the four predictor variables for primary care practices. Among multispecialty practices, there are two predictor variables with significant correlations, but one independent variable (TrackEffMeas) exhibits a negative relationship where a positive correlation with ACO development was expected. Interestingly, the surgical specialty groups do exhibit a predicted negative correlation between cost concern challenges and ACO development. This finding has an intuitive logic, in that surgical specialties would need to develop (either through merger or acquisition) the capacity to provide care coordination and primary care processes in an ACO model. This is not routinely an element in the delivery of surgical care, and this result may reflect the acknowledgement of increased organizational costs for these types of groups to match this changed environment.

Hypothesis 3, the acquisition of resources through merger or acquisition to engage in ACOs, was supported in both the multispecialty and primary care groups. Multispecialty groups exhibited a positive significant correlation between engaging in a PCMH and engaging in ACO development, while primary care groups both demonstrated this correlation and a strong relationship between joint venture activity and ACO development. This latter finding supports both the centrality of primary care to the ACO model and also the recognition by primary care groups that successful execution of an

ACO strategy requires engagement with other organization to develop the necessary resources to pursue this strategy. Surgical specialty groups did not exhibit a significant relationship on either predictor variable with ACO development. The finding echoes the finding in Hypothesis 2, and suggests that surgical specialty groups in general seeking to develop relationships with other organizations that are pursuing an ACO strategy. Rather than being initiators, surgical specialty groups may be acting passively in this environment while pursuing a narrower business strategy. This conclusion is supported by research this suggests single specialty surgical practices to some degree are more directed at becoming “focused factories” for the provision of their specific medical services (Casalino, Devers, & Brewster, 2003).

Hypothesis 4, the examination of both organization size and complexity, is again supported for the element of size but not complexity among the subgroups. All three practice types exhibited a positive significant correlation between size and ACO development. Interestingly, there is a positive significant relationship between the challenges of primary care versus specialists and ACO development within the surgical specialty subgroups. While the finding suggests an understanding of this issue on the part of surgical specialty groups, a negative relationship would be predicted, indicating that these challenges would be progressively smaller in organizations working to develop an ACO strategy. This anomalous finding suggests further research into the organizational constructs and operational priorities of surgical group practices.

In general, the examination of the survey respondents by practice type supports the overall logistic model, with exceptions for surgical practices discussed above.

Another important consideration for medical groups is the organizational structure, or governance, of the practice. The majority of medical groups responding to the survey are self-governing organizations, but others include medical groups that are either part of a larger integrated delivery system (such as a hospital system), groups that are components of medical schools (faculty practice plans), or other are constituted as other organizations such as Federally Qualified Health Centers (FQHC), urgent care organizations, or other entities. The governance of an organization will determine strategic responses to the external environment, and it is expected that medical groups that are self-governing may respond differently than those that are part of a larger organization, such as hospital-owned or medical school group practices.

To examine this, the logistic model was again examined within subgroups of organizational type. As noted in Chapter 5 above, to examine the effect of governance, the variable OrgType was developed from Question 1, with the survey respondent organizations being classified as either physician group practices (N = 670), hospital-based medical groups (N=152), medical school groups (N=44), or other governance models (N=88). The logistic regression analysis was executed on each subgroup, with a $p < .10$ significance threshold. The results of these regressions are compared to the main model below. Each predictor variable is listed, with odds ratios reported where $p < .10$.

Table 16 - Analysis of ACO model by Organization Type

Q21ACO	Main Model	Physician Group	Hospital-based	Other	Hypothesis
	(N= 954)	(N= 670)	(N=134)	(N=106)	
ManageClinInfo	1.163768***	1.185917***		1.581356****	1
QualMeas	1.101569***	1.094633**			1
CareManage					1
PayerIncentPymts	1.648788*		6.505439*		1
EHR					1
CostConcernChal					2
TrackOperCost					2
TrackPayerCost					2
TrackEffMeas					2
JointVen	1.533538**	1.532737*		2.505548*	3
PCMH	1.855149****	1.982617***	3.180832**		3
Q25FTE	1.358612****	1.298618****	1.346687*	1.427738**	4
GroupAlignChal					4
PriSpecChal			1.168715*		4
ACODevChal					4
_cons	0.1020621	0.1070726	0.1191018	0.458328	
(* p < 0.10; ** p < 0.05; *** p < 0.01; **** p < 0.001)					

The results for physician-governed medical groups follow the logistic regression model, and this is not surprising given that these groups represent seventy percent (70.23%) of the responses in the logistic model. The small number of medical school groups (N = 44) did not produce any statistically significant correlations between the predictor variables and ACO development. Most interesting here are the results for the hospital-based medical groups. The large values for the odds ratios of PCMH activity are expected based on the organizational structure. Medical groups which are components

of larger integrated delivery systems serve as the coordinating element for healthcare delivery across the larger organizational entity. And the odds ratio for PCMH activities reflects the ability of hospitals to mobilize both resources and processes that are not easily engaged by small and medium-size medical groups (D. R. Rittenhouse et al., 2011; Nutting et al., 2011).

Correspondingly, the absence of a statistically significant relationship between the predictor variable JointVen and ACO development is interesting. Medical groups that are a component of a hospital or integrated delivery system are by definition engaged in a joint venture in the provision of healthcare services with the institution of which they are a component. It is not clear whether respondents considered the question as an inquiry of medical group participation in a joint venture beyond the ownership structure of the organization, or alternately if economic activity within the larger structure is not considered a “joint venture” due to the risk being residual in the larger organization rather than the medical group. As more medical groups become components of larger entities, it may be the case that entrepreneurship at the group practice level will be enveloped into large corporate strategies, which has some support in the literature (Cuellar & Gertler, 2006; Budetti et al., 2002).

What is particularly striking is the odds ratio for receiving payer incentive payments. This factor variable is generated from Question 16, which asked respondents whether the organization had received incentives from third-party payers for various types of performance improvement measures, including process measures, outcome measures, and financial performance measures. A one-unit increase in receiving

incentive payments by the organization increases the odds ratio participating in ACO development by over 600%. This is a strong indication of the response of hospital-based medical groups to external environmental change. It suggests that these groups have become components of larger healthcare organizations to develop capacity in navigating an environment where organization survival and success require moving beyond traditional fee-for-service payment mechanisms. And it indicates that hospital-based groups will have a distinct advantage over free-standing medical groups in adapting to a changing environment for the delivery of services.

In summary, then, the analysis of the MGMA dataset on responses to an evolving healthcare environment supports two hypotheses. Hypothesis 1 is supported by the results indicating medical groups which have structural elements that align with the requirements of ACOs are more likely to pursue a strategy of ACO development. Hypothesis 3 is supported in that medical groups which have worked to acquire specific resources important to this new environment of healthcare delivery, as noted through participation in joint ventures and PCMH activity, are also more likely to pursue ACO development. And Hypothesis 4, which suggested that size and complexity would be related to ACO development, was only supported in terms of organization size. The results for the impact of organizational size on the likelihood of ACO strategy was both the most consistent and the strongest result of this analysis. Clearly, size matters for all medical groups, and this result holds regardless of practice type or organization type.

Hypothesis 2, which related organizational efficiency to ACO development, was not supported by the results of the logistic model. The question of organizational

resources may affect this finding, in that many of the groups are small (50% have 10 FTE physicians or less), and therefore may lack the ability to track efficiency measures or costs from either an organizational or payer perspective. However, some medical groups possess the capacity to track and report internal cost and efficiency data. The MGMA also surveys groups on both their costs of operation and their physician production and compensation.

The MGMA Cost Survey, conducted in 2011 and based on 2010 data, includes information regarding the demographics of medical practices, including practice type, the population of the organizations primary location, number of FTE providers by type (primary care, surgical specialists, non-surgical specialists, and physician vs. non-physician provider), number of support staff by type, physical facility size, and the number of satellite facilities where services are provided. The survey captures extensive financial data including medical charges and revenues (including adjustments to medical charges by type), support staffing and associated costs with reporting of FTE staff members by type, general operating costs, provider staffing and associated costs including both physician and non-physician providers, non-medical revenues and associated costs, and net practice income and loss. Beyond the financial data, the survey collects information on the implementation and use of electronic health records, accounts receivable analysis, volumes and charges of output measures such as medical and surgical procedures, clinical laboratory and imaging procedures, and standard measures of provider productivity in reporting relative value units (RVUs) for services provided.

Finally, the survey additionally captures a breakout of both charges and revenue by payer source.

The MGMA Physician Production and Compensation Report, a 2011 survey based on 2010, captures data within medical groups at the level of the individual provider, and provides data on physician and non-physician provider compensation and production, as well as managerial compensation. For each individual provider, information is collected regarding provider specialty, gender, age, years in practice, total compensation and benefits, methods of compensation, allocation of time between clinical and non-clinical activities, gross charges for professional services, net collections for professional services, total relative values units and physician work relative value units generated, and whether non-physician provider productivity is included in physician productivity reported. Additionally, the survey includes data of the numbers, job classifications, and compensation of medical group practice management staff. The survey also collects basic organizational information that mirrors medical group practice level data collected in the Cost Survey above.

Medical group practices that report data in both of these surveys have the capacity to track efficiencies, both at the level of the organization, and at the level of the individual provider. Examining those medical groups which completed the ACO survey and both the cost and production surveys should reveal whether the hypothesis of efficiency for ACO development can be supported.

Of the 954 medical groups in the ACO dataset, a subset of 151 groups also completed these two surveys. In analysis of the logistic model for this subset, the null hypothesis for Hypothesis 2 again could not be rejected. The results are presented below:

Table 17 - Analysis of ACO model for Cost & Production Survey Respondents

Logistic regression		Number of obs	=	151		
		LR chi2(15)	=	54.9		
		Prob > chi2	=	0.0000		
Log likelihood = -59.844067		Pseudo R2	=	0.3415		
Q21ACO	Odds Ratio	Std. Err.	z	P>z	[95% Conf.	Interval]
ManageClinInfo	1.626976	0.2452082	3.23	0.001	1.21112	2.185622
Q25FTE	2.041779	0.4089867	3.56	0.000	1.378813	3.023514
PriSpecChal	.8692172	0.0669839	-1.82	0.069	.7473649	1.010937
GroupAlignChal	1.219885	0.1013088	2.39	0.017	1.036641	1.43552
_cons	.002808	0.0041804	-4.11	0.000	.0001698	0.046116

As noted in Table 17, there are no significant correlations between the variables of TrackOperCost, TrackPayerCost, TrackEffMeas, and CostConcernChal and the dependent variable for those groups who possess the capacity to examine internal and external measures of efficiency.

These findings provide both a statistical model and an overview of the capacity of medical group practices to engage in ACO development and participation. Groups of sufficient size possessing structural elements of ACOs, with experience of interactions with other healthcare organizations are more likely to be engaged in ACO development. The policy implications of these results and the larger context of environmental change in the health sector are discussed in the next chapter.

CHAPTER SEVEN: DISCUSSION AND IMPLICATIONS

This research has developed a logistic model of the propensity of medical group practice organizations to participate in ACOs. The analysis of the MGMA survey data suggests that medical groups that have experience with care management processes, adapting to payer incentive systems, entering into joint venture activities with organizations, development of PCMH models, and are of a sufficient size are more likely to participate in ACO development than medical group practices that do not exhibit these traits. Not supported in model is support for the importance of experience in tracking operating and cost efficiencies as a predictor of ACO participation. The overall results of the model are relatively robust for both varying types of medical group practice provider composition and organization governance. Additionally, increased experience in measuring both productivity and operating costs were not demonstrated to increase the relevance of practice efficiencies as predictors of participation.

Given the findings noted above, the issues of concern for the applicability of this research involve the limitations and generalizability of these results, the impact of this research on policy, and future directions for research in this sector.

Section One – Limitations and Generalizability

As noted by the MGMA, the study conducted to obtain this data was a convenience sample of medical group administrators who responded to a communication

from the MGMA to participate in the survey. This association noted that the results “represent one of the largest populations of healthcare organization to describe their plans on integrating services, as well as their attitudes toward accountable care” (Medical Group Management Association, 2011). As such, the survey provides broad insight into the strategy planning and operational readiness of a key component of the healthcare delivery sector.

It would be beneficial if the logistic model developed in this research could be considered to be broadly representative of the state of medical group practices. A major impediment to this generalization is the lack of a comprehensive survey of medical group practices. The AMA conducted a periodic survey of medical groups, reporting on the results on approximately a quadrennial basis. However, this survey has not been published since 1996 (Havlicek & American Medical Association, 1996). The AMA had additionally conducted an annual socioeconomic survey of physicians from the 1980’s through 1999.

In 2012, the AMA developed the Physician Practice Benchmark Survey (PPBS) as a “nationally representative sample of post-residency physicians who provide at least 20 hours of care per week and were not employed by the federal government at the time of the survey” (Kane & Emmons, 2013). This survey was completed by 3466 physicians and was validated against both the Epocrates Honors panel of 155,000 physicians participating in the Epocrates drug information software system as well as the larger 655,00 physician AMA Masterfile. Meaningful to the research on medical group

participation in ACOs, the survey asked respondent to indicate both practice size and ownership arrangements.

The PPBS survey report, Policy Research Perspectives, reported in Exhibit 4 the distribution of physicians by practice size (Kane & Emmons, 2013). The report categorized physician practice size from 1 physician (solo practice, with 20% of respondents) to physicians in groups of 50 or more (12.2% of respondents). An additional 20% of physicians were in groups of 2-4 physicians. It also separately indicated that 5.8% of respondents were direct hospital employees. To compare this distribution to the MGMA survey sample, the percentages were converted to actual counts. The solo practitioners and direct hospital employees were removed from the population. Additionally, since the MGMA dataset in the regression model analysis was limited to groups of 3 or more physicians, the count for physicians in groups of 3-4 was estimated to be fifty percent of all physicians in groups of 2-4. Based on this, the following comparative table of physician group sizes was tabulated:

Table 18 - Distribution of Physicians by Practice Size

Group Size	PPBS Survey		MGMA Dataset	
	Count	%	Count	%
3-4	332	15.55%	159.00	16.48%
5-9	629	29.46%	290.00	30.05%
10-24	532	24.92%	242.00	25.08%
25-49	236	11.05%	100.00	10.36%
50+	406	19.02%	174.00	18.03%
Total:	2135	100.00%	965.00	100.00%

A chi-square test for the differences in the distribution of these two populations failed to reject the null hypothesis that the MGMA dataset distribution was dissimilar from the national PPBS survey ($p > .483179$). This suggests, but does not adequately support, the potential generalizability of characteristics of the MGMA data as representative of medical groups in the United States.

A similar calculation was performed to compare ownership of medical practices in the PPBS survey to the ownership distribution of practices in the MGMA dataset. This chi square analysis rejected the null hypothesis that the populations were similar in ownership ($p > .000$). The PPBS data indicated a significantly higher percentage of physician practices owned by hospitals (24.79% of comparable groups compared to 14.09% in the MGMA dataset). Noting the effect of hospital ownership in both the influence of payer incentive payments and PCMH participation observed in the findings, it would be important for these populations to exhibit the a similar distribution to make claims of generalizability of these results. Absent this similarity, it can only be concluded that the findings are suggestive of the importance of hospital governance in these factors of ACO participation.

While the literature has been reporting an increased trend in the acquisition of physician practices by hospitals and integrated delivery systems (J C Robinson & Casalino, 1996; Burns, Goldsmith, & Sen, 2013; Kirchhoff, 2013), this is not the reason for the differences between these two populations. Both the MGMA and the PPBS surveys were conducted within eighteen months of each other. There has been increased consolidation of physician practices into IDS models, but the differences cannot be

explained through a massive consolidation in anticipation of PPACA regulatory requirements or MSSP participation requirements. The more appropriate evaluation of these differences is that the universe of medical group practices is neither well-defined nor well-measured. As noted by one leading researcher of physician practice organizations in describing the limitations of his team's research on medical group entry into ACO organizations, "...we cannot claim that ours was a precisely representative sample. There is no 'gold standard' data set that contains the population of US physician practices" (Casalino et al., 2013).

Another limitation of this analysis of the MGMA survey is the issue of response and non-response bias. It is possible that medical groups which were more aware of emerging organizational structures (such as ACOs and PCMHs) were more likely to respond to the survey than the universe of medical group practices. Responding groups with an awareness of environmental change could possess organizational elements which align with ACO participation that are not exhibited by groups that did not participate in the MGMA survey.

However, it may be the case that non-respondents were engaged in predictors of ACO participation, such as care management processes, participation in joint ventures, and constructs to manage clinical information, but did not designate the development of new organizational structures as a priority strategy. A broader response that included medical groups not concerned about new organizational structures could shift the significance of the predictors of ACO participation. From reviewing the difficulty of

generalizing the sample of medical group respondents to the larger population examined above, this limitation in the generalizability of the logistic model must be considered.

The issue of response bias brings into examination the definition of ACOs and ACO participation. The dependent variable was developed from responses to Question 21, which asked “Which of the following best describes your organization’s current ACO status?” Respondents to the survey included 68 medical groups (7.05% of the groups included in the analysis) that indicated “Our organization believes we currently are an ACO or part of an ACO.” The introduction to this survey question noted that there are different variations of accountable care-type organizations. For the purposes of completing the questionnaire, the instructions for Question 21 asked respondents to define an ACO as “an organization that has the goal of figuring out how to minimize the total cost of caring for a patient population while still meeting the standards for quality of care and patient satisfaction.”

This is an overly broad definition, which does not take into account issues of achieving minimal benchmarks for cost savings in treatment, enhanced or complex quality performance measurements, or the potential of population-based risk management. These elements of Medicare Pioneer ACOs and MSSP ACOs were regulatory developments that emerged subsequent to the time frame of this survey (spring 2011). When this survey was initiated, CMS had just completed the Medicare PGP demonstration project involving ten large delivery systems. Other commercial insurance-based ACO-type projects were underway, exhibiting a broad spectrum of financial incentive, quality management, and risk-sharing arrangements (Foster et al., 2012).

Since the definition of an ACO and the specific components of the ACO model were still being developed at the time of the survey, it is important to examine these responses. The medical groups which indicated in 2011 that they were an ACO or part of an ACO may have been a part of these commercial projects, or may have simply been engaged in more accountable care delivery in return for incentives. It could be considered a tautology to model predictors of ACO participation among the organizations which stated a positive response to ACO participation in the dependent variable. To examine this, the logistic regression was run for the subset of medical groups which did not indicate participation in ACOs (N=868) and compared to the full model of all respondents. The results are presented below:

Table 19 - Comparison of ACO model to non-participants

	Main Model (N= 954)	Not ACO partic. (N= 866)
Pseudo R2:	0.1326	0.1320
ManageClinInfo	1.150557***	1.208513****
QualMeas	1.071871***	1.081896**
CareManage		
PayerIncentPymts	1.648788*	
EHR		
CostConcernChal		
TrackOperCost		
TrackPayerCost		
TrackEffMeas		
JointVen	1.533538**	1.405113*
PCMH	1.722332****	2.037261****
Q25FTE	1.348827****	1.405185****
GroupAlignChal		
PriSpecChal		
ACODevChal		
_cons	0.1012703	0.0816893
(* p < 0.10; ** p < 0.05; *** p < 0.01; **** p < 0.001)		

These results indicate that the model remains robust when removing participants which indicated an active participation in an ACO. All but one of the predictors remained, and in general the levels of significance were essentially the same for the predictors in the non-participant regression. The one notable result was the removal of PayerIncentPymts as a significant predictor of ACO participation. In the full model with stepwise regression, this variable has significance at the level of $p < 0.084$. In the model that removed the 68 medical groups which indicated participation in an ACO, the variable is removed in stepwise regression. This finding supports the general observation that medical groups reporting ACO participation are involved in care delivery constructs that provide incentives for financial performance. It does not support the conclusion of a tautology in the model, but does suggest that certain groups are more advanced in possessing elements that align with the evolving environment of health care delivery.

There is some degree of support for these findings in the literature. Research into small-to-medium size medical group practices engaged in care management processes (Alexander, Maeng, Casalino, & Rittenhouse, 2013) found that payer incentive payments were important to group participation in these activities. Group size and engagement with other entities, while not significant across of the estimation models developed by the authors, did align with the findings in presented in this research.

Similarly, in comparing issues of costs and quality in the provision care by medical group practices in the upper Midwest (J. Kralewski et al., 2014), researchers noted that the lack an EHR linked to specialists and hospitals did not constrain small independent groups from outperforming IDS group practices in both cost and care

delivery measures. While limited in their applicability to the current model of ACO participation, these recent studies suggest a degree of support for the broad findings of factors that characterize medical group preparedness for a changing healthcare environment.

A final limitation to the generalizability of these findings relates to the influence of market factors in the participation of medical groups in ACOs. The concentration of medical services delivery in a specified market may act as a deterrent for participation in an ACO. This is particularly applicable in the situation where a number of diverse medical groups provide services in a region that is dominated by a larger hospital or IDS. The groups may choose to forego developing an ACO as a competitive strategy to dominant providers, based on a conclusion that large health systems can bring more expertise and resources to the creation of ACOs.

There has been some research on market factors in ACO formation that supports this premise (Lewis, Colla, Carluzzo, Kler, & Fisher, 2013). Lewis et al examined 227 ACOs in 2012 and matched their service locations with hospital service areas (HSA) as defined by the Dartmouth Atlas of Health. Their findings suggest that ACO formation is associated with a higher Medicare per capita spending, fewer primary care medical groups, a greater penetration of managed care, and more urban locations. In examining medical group practice characteristics, the researchers noted that the number of physician groups is negatively associated with ACOs in a given region, and that regions that are organized into fewer groups exhibited a higher likelihood of ACOs engagement. This finding may support the finding in this research that size of medical groups is important

to ACO formation. Alternately, it could suggest that in those regions with fewer, and potentially larger, groups, the medical practices have a more developed relationship with insurers in managed care delivery, and therefore possess those processes necessary to move into an ACO environment.

The logistic regression model presented in this research could be informed with the inclusion of market level control variables that addressed issues of market concentration, managed care penetration, and hospital characteristics. Due to the de-identification of the respondents in the MGMA survey data utilized for this research, these controls could not be included in the model. The research by Lewis et al points to several important elements that should be examined to develop a deeper understanding of ACO participation by medical groups, including the size and distribution of primary care provider organizations in a locality.

The larger issue of how this research informs policy in a rapidly changing environment of healthcare delivery is presented in the section.

Section Two – Policy Implications

In examining how this research informs policy regarding ACOs, it is useful to recall the genesis of the ACO construct. Section 3022 of this legislation was developed from the program elements of the Medicare Physician Group Practice demonstration project created by CMS. The ten organizations that participated in the PGP were large, well-established organizations that had prior experience in both coordinating care delivery as well experience in tracking and reporting on quality measures (Iglehart, 2005). However, as noted above, while all participating groups were

able to achieve the established quality reporting benchmarks, only four groups achieved sufficient delivery savings to earn a bonus payment.

This pattern appears to have been repeated in the implementation of ACOs under the PPACA. Larger, more experienced organizations were encouraged to participate in the Pioneer option, which required management of a larger Medicare beneficiary population (15,000 minimum beneficiaries vs. 5,000 in the MSSP programs). However, the Pioneer option, initially adopted by thirty-two organizations, provided a higher level of shared savings, and was designed to move these organizations into population-based payment by the third year of participation (Centers for Medicare & Medicaid Services, n.d.-a). The results of the first year of participation in the Pioneer ACO program found that only eighteen of these organizations achieved savings, with fourteen losing money on their ACO operations. Of the eighteen that achieved savings, only thirteen had savings above the MSR threshold to receive shared savings from CMS, and of the fourteen organizations that experienced losses, two were sufficiently high that they owed payments to Medicare (Bunis, 2013). Nine of the original thirty-two Pioneer ACOs have withdrawn from this program, with seven organizations moving into the lower-risk MSSP program, and two withdrawing from participation altogether. Policy analysts have commented extensively on these initial results, with many emphasizing the mixed results, and the steep learning curve for early adopters (Damore & Champion, Wes, 2013; Kocot, S. Lawrence, Farzad, & White, Ross, 2014). Others had examined the issue of “low-hanging fruits” and suggest that increased savings may not be sustainable (Lieberman, 2013).

Similarly, the initial results of the first year performance of MSSP ACO participants mirrored the results of Pioneer ACO participants. Of the one hundred fourteen initial MSSP participants, fifty-four that started operation in 2012 achieved savings and of those only twenty-nine achieved sufficient savings to qualify for bonus payments (Centers for Medicare & Medicaid Services, 2014). However, unlike the Pioneer program, the majority of the MSSP participants were engaged in one-sided risk, which allowed them to potentially receive a smaller bonus without the risk of repayment of losses. This arrangement suggests that these participants are less likely to withdraw from the program.

Commentators have theorized that a leading cause of the failure to achieve savings was the lack of internal processes necessary to develop operational efficiencies (Muhlestein, 2014). The premise is that with a lack of downside risk, the ACO organizations have spent the first year of participation as a learning experiment to improve internal processes. This suggestion echoes the findings presented in this research. The hypothesis that organizations with more highly developed cost and operational efficiencies would have a higher propensity to participate in ACOs was not supported by the data. Examination of a subset of medical group practices that have experience in reporting on both costs and production at the level of the provider as well as the organization confirmed that this is not a predictor of ACO participation. When considered within the first-year results of both Pioneer and MSSP participants, a pattern emerges that indicates medical practices may need additional incentives or supports to develop mechanisms of efficiency. The predominant business system under which these

organizations operate is a fee-for-service model that emphasizes and rewards production of healthcare services over the efficient production of the most effective services. Shifting to efficient, outcome driven models of care may require policy initiatives to encourage the development of these mechanisms.

This shift in emphasis is mirrored by the growth of quality measurements as a component of compensation for medical services. Providing incentives to report on quality has been adopted by commercial carriers for over a decade (Rosenthal, Fernandopulle, Song, & Landon, 2004). It is also an element in providing services to Medicare beneficiaries, though the implementation of both incentives and penalties in achieving meaningful use requirements in Medicare payments through adoption of EHR systems (Blumenthal & Tavenner, 2010). The findings in this research supported the hypothesis that those organizations which engage in the management of clinical information and quality measures are more likely to participate in ACOs. The development of external forces for the creation of efficient delivery systems may spur medical groups to develop practices that align with the desired efficiencies to constrain costs under an ACO model.

A counterargument to the above is that the CMS ACO program is the incentive itself for medical organizations to develop these efficiencies. However, noting that even large organizations have difficulty achieving these costs benchmarks, and recognizing that most provider organizations are small, broadly dispersed, and are highly heterogeneous in specialty composition, it would appear that these organizations require

at least an intermediate step to achieve cost efficiencies. Some researchers look at medical group participation in other delivery systems as that intermediate step.

The findings of the logistic model for ACO engagement strongly support the hypothesis that size matters in propensity to pursue this strategy. Yet the majority of physicians practice in groups of less than ten physicians (Kane & Emmons, 2013). One pathway to creating a larger structure is based on medical groups that are currently participating in independent practice associations (IPAs) and/or physician-hospital organizations (PHOs). This has been examined as a way for smaller groups to both improve care and participate in ACOs (Casalino et al., 2013). This research emphasized the participation of small to medium-sized medical groups (3-19 FTE physicians) in care management processes as component of participation in either an IPA or PHO. The findings indicated that while most of the practices did not participate in either an IPA or PHO for the majority of their patients, nearly twenty-five percent in their sample did participate, and that this participation resulted in a doubling of the number of care management processes followed by the medical groups. The authors note that the PPACA specifies both IPAs and PHOs as organizations which qualify as ACOs. Their conclusion is that this participation could be a viable alternative to hospital employment or merging into a larger provider organization. However, this research does not address the issue of whether these smaller medical groups will be able to develop the operational efficiencies necessary to succeed in an ACO environment. There is nothing to suggest that either IPA or PHO organizations have the expertise and resources to support medical groups in becoming more efficient in care delivery.

The alternative to working through these organizations to engage in an ACO is noted by the authors to be the acquisition of medical practices by a hospital or IDS. This is an increasing phenomenon in the health delivery sector, and has policy implications. The regulations developed by CMS for the ACO model recognized that antitrust concerns would be a potential issue. The agency worked with the Department of Justice and the Federal Trade Commission to develop guidance for organizations combining together to form ACOs that would provide them with language to assist in the formation of “procompetitive ACOs that participate in both the Medicare and commercial markets” (“USDOJ: Department of Justice/Federal Trade Commission Issue Final Statement of Antitrust Policy Enforcement Regarding Accountable Care Organizations,” 2011).

While this policy provides reassurance to the formation of ACO entities, it may create an unintended consequence in offsetting ACO savings due to rent-seeking behavior. The potential of health delivery system integration for ACOs as a driver to increase costs rather than lower them has evidence in the literature. The problems of vertical integration have been outlined to include increased ordering of services within the healthcare system, creating competitive advantages by “locking up” physicians to a single hospital, through bundling services and charging prices above both market rates and marginal costs (O’Malley, Bond, & Berenson, 2011). Evidence of both higher prices and higher spending resulting from vertical integration in the health delivery sector has been well-documented (Cuellar & Gertler, 2006; Baker, Bundorf, & Kessler, 2014). While some research has suggested that the formation of ACOs is associated with integrated systems, but not high medical spending (Auerbach et al., 2013), this analysis

examines the landscape of regions at the onset of ACO delivery systems, not subsequent to their implementation and operation.

The larger issue here is the ability of the ACO delivery system to achieve meaningful constraints to increased spending in the health sector. The Congressional Budget Office scored the ACO program to achieve a total of \$4.9 billion in Medicare expenditure savings between FY2013 and FY2019 (Newman, 2011). Compared with the overall impact of the PPACA, this is a modest amount. By comparison, the Independent Payment Advisory Board, designed to control Medicare expenditures through adjustments to payment rates and program rules is scored to create triple the savings of the ACO program (\$15.7 billion). Because the reward of achieving benchmark savings bonuses would be minimal to the individual provider in an ACO, the potential constraint in expenditure growth may reside in limiting the use of specialists and their associated technology in the provision of care. The use of care management protocols and early preventive care are seen as the main drivers in reducing expenditure growth (Medicare Payment Advisory Commission, 2009).

The research findings presented in chapter six indicate that participation in joint venture activity with other healthcare organizations is a significant predictor of ACO participation, specifically for primary care group practices, and those owned by physicians. It is not clear that this participation leads to the types of vertical integration, and associated issues, presented in the literature. However, from a policy perspective, increased concentration of service provision does have the potential to raise prices and dilute cost-saving behavior. Given the small level of anticipated savings, vertically

integrated organizations may find it preferable to forgo ACO participation and simply seek leverage through market control.

A final policy implication of these findings is the broader adoption of ACO participation among medical group practices. The development of ACOs has increased in both the public and private sectors. At the end of 2010, subsequent to the enactment of the PPACA but prior to the development of CMS regulations for Medicare ACOs, there were a small number of commercial ACOs, primarily developed through joint ventures with large insurance companies such as Anthem Blue Shield, United Healthcare, and Humana (Larson et al., 2012). With the creation of Medicare Pioneer and MSSP ACOs, and the increased interest in commercial ACO development, the universe of ACO organizations has grown to over 500, with approximately one-half stemming from Section 3022 of the PPACA, and the rest through non-government contractual arrangements with commercial insurance carriers (Peterson et al., 2103).

However, at the end of 2013 it appears that there has been a slowdown in the creation of new ACOs, and a leveling off of the number of covered lives in ACO constructs. There are several reasons suggested for this slowdown, but health policy analysts have generally agreed on three main drivers of this trend: a mature market for trailblazer organizations; a lack of a proven model to accept increasing risk on the provider side of the ACO; and somewhat lesser is a reluctance of payers to offer new ACO contracts (Muhlestein, 2013). While the latter factor of contract offering is beyond the control of medical groups, the issue of being a trailblazer coincides with the research presented here. The model developed for ACO participation supported the concept of

organizations willing to engage in new forms of care delivery, including both joint ventures and the creation of PCMH structures. Moreover, the concern of the challenge of ACO development did not exhibit a significant negative correlation prediction with ACO participation, as hypothesized.

But it may be the case that early adopters organizations which seek to align with this new environment are now fully engaged, and second-movers are awaiting clearer signals before engaging in ACO participation. These signals include a fuller understanding of the potential of ACOs to achieve shared savings, a result that has not been demonstrated to date. CMS is now only enrolling ACOs once at the beginning of each calendar year, both limiting the update of an ACO strategy and increasing the delay in presenting cumulative results from multiple ACO entrants. To the degree that this acts as disincentive for follow-on organizations to engage in an ACO, the impact of the policy's aims of improved health and slowed health spending will be lessened. Correspondingly, these organizations may also be waiting to examine which operational models emerge to manage population risk, particularly among large organizations that would mirror the Pioneer ACOs. This is a logical response given that most medical groups are not currently participating in any type of risk-sharing arrangements. The degree to which current organizations continue to participate in ACOs and achieve efficiencies in managing risk and saving money will be important in attracting subsequent participation by other medical groups. Given this difference between early adapters to environmental change and organizations not pursuing these strategies, it is useful to

consider what further research would inform this issue. The final section of this chapter examines areas for future research.

Section Three – Directions for Future Research

Based on examination of the limitations of the current research project, and the implications of this research to inform policy, three areas emerge as potential directions for future research. While the research on medical group practices in the healthcare delivery system remains underreported in the literature (as compared to hospitals or the individual provider), specific areas of inquiry could help to provide greater insight regarding how these organizations will respond to a changing environment. In each of these areas, current research refers to the activities of medical groups as “black boxes”, with insufficient knowledge of these organizations to inform health services research and policy (Brach et al., 2000; Conrad & Christianson, 2004).

First, research needs to focus on what makes medical groups seek to adapt to new organizational structures, or alternately acts as a barrier to this strategy. While this research project has focused on ACO participation, this is only one of numerous new structures that have emerged in the healthcare delivery system in recent years. The growth of the PCMH model, expansion of the urgent care model for primary care, the emergence of “concierge” or access-fee based organizations, and the increased use of telephonic apps for diagnosis and treatment, often by non-physician providers, are all examples of shifts in the healthcare sector from the primacy of the physician-patient relationship to the organizational context for the delivery of care. How organizations choose to evaluate these emerging delivery models, which are the relevant stakeholders

within the organization, and how the perceived benefits and barriers are evaluated are all areas of inquiry that could help policymakers understand how medical groups might respond to policy initiatives.

Second, this research has revealed an issue regarding how medical practices develop measures of efficiency for both internal and external reporting purposes. With an increasing emphasis on risk-based provision of care, medical groups will need to develop substantial expertise in this component of financial management. As noted, medical groups have traditionally measured efficiencies of production in terms of the costs associated with the production of specific health services. Tracking revenue on a per-provider, per-service basis and measuring it against marginal costs is a typical mechanism employed by medical groups to determine compensation for providers.

However, ACOs are predicated on a shift to population health, and in this environment the meaningful measurement of production involves the costs for an episode of care. Medical groups face a challenge to shift both their internal financial reporting and to develop mechanisms to track the costs of health services across multiple organizations (medical group, diagnostic testing centers, hospitals, post-acute care facilities, etc.). The compensation-driven financial reporting systems will need to be overlaid with these episodic care measures to allow medical groups to engage in risk-based payment systems. Timely research on the adoption of these types of financial reporting systems could inform policymakers regarding the capacity of medical groups to measure efficiencies in delivering population-based care, and on their ability to increase risk-based healthcare delivery.

Finally, this research suggests that differences in medical group practice responses to environmental change are influenced by the governance of the organization. Groups that were physician-owned did respond differently on the factors influencing ACO participation than those groups which were owned by a hospital or part of an integrated delivery system. More elements of the logistic model were significant for ACO participation among physician-owned practices, including structural elements such as utilizing information systems to manage clinical information and collect quality data on quality measures, and engaging in joint venture activity.

The literature previously discussed in this chapter has pointed to increasing vertical integration of medical groups into complex health delivery systems. An unexamined question is where the strategic planning focus resides in these integrated organizations. What may be optimization for the medical group may not be an appropriate strategy for the larger entity, as well as the opposite. The effect of this on the response to policy seeking a more efficient and effective health system is an issue that would appropriate for deeper examination. The provision of care to an individual patient remains under the autonomy of the provider, but where and how decisions regarding the structure of healthcare delivery are made have real consequence on the implementation of policy such as Section 3022 of the Patient Protection and Affordable Care Act.

APPENDIX: ACO SURVEY INSTRUMENT

The Medical Group Management Association (MGMA) administered the ACO survey in the spring of 2011. The survey was posted through a Survey Monkey instrument with results being collected by MGMA survey staff. Reproduced below is the survey as it appeared to the membership of the organization:

The Evolving Healthcare Environment: Status and Readiness, 2011
Introduction
Background MGMA recognizes that the healthcare environment is evolving. Changes are being driven by new government legislation, innovation by commercial payers and initiatives by providers. New payment and incentive models are being designed to change the way care is delivered.
Research Objectives The goal of this study is to assess the readiness of medical groups, hospitals and other organizations to adapt to new care delivery and payment models. The results of this study will help MGMA members and other organizations understand what they need to do in order to be successful. MGMA will use these results to design solutions to help organizations in their efforts to adapt.
Confidentiality All responses are confidential. Your identity will not be published or released without your permission.
General Questionnaire Information and Instructions 1. As a thank-you for participation, MGMA will send you an e-mail with a link to the results. 2. This questionnaire should take 15 to 20 minutes to complete. 3. If you are not the best person in your organization to respond, please forward this link to another person. 4. If you have questions, please contact:
Tim Coker, MGMA Research Fellow, tcoker@mgma.com, 877.275.6462, ext. 1880
or
James W. Margolis, MPA, FACMPE, MGMA Senior Project Manager, jwm@mgma.com, 877.275.6462, ext. 1275.
Deadline: July 1, 2011
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The Evolving Healthcare Environment: Status and Readiness, 2011

Organization type

*** 1. Which of the following best describes your organization?**

- ☐ Physician-owned medical practice
- ☐ Hospital-owned or integrated delivery system (IDS)-owned medical practice
- ☐ Hospital or IDS
- ☐ Medical school faculty practice plan or academic clinical science department
- ☐ Federally Qualified Health Center (FQHC), community health center or similar practice
- ☐ Retail walk-in primary care clinic
- ☐ Urgent care center
- ☐ Freestanding ambulatory surgery center (ASC)
- ☐ Management Services Organization (MSO)
- ☐ Physician Practice Management Company (PPMC)
- ☐ Independent Practice Association (IPA)
- ☐ Physician Hospital Organization (PHO)
- ☐ Insurance company or Health Maintenance Organization (HMO)
- ☐ Healthcare consulting, legal or accounting firm
- ☐ Other

Please describe "Other".

The Evolving Healthcare Environment: Status and Readiness, 2011

Joint venture revenue sharing

*** 3. Has your organization created or joined a business entity, such as a joint venture, for the purpose of sharing expenses and revenues with another healthcare delivery organization?**

- ☐ Yes, with one or more hospitals
- ☐ Yes, with one or more medical practices
- ☐ Yes, with one or more hospitals AND one or more medical practices
- ☐ Yes, with another type of healthcare delivery organization
- ☐ No
- ☐ I do not know or not applicable.

Other? Comments?

The Evolving Healthcare Environment: Status and Readiness, 2011

Joint venture leadership

4. In your opinion, how fairly does the leadership of the joint venture represent your organization's interests?

	Very unfair	Unfair	Neutral	Fair	Very fair	I do not know or not applicable.
Leadership fairness	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Comments?

The Evolving Healthcare Environment: Status and Readiness, 2011

Planned joint ventures

5. How likely is it that your organization will enter into a joint venture that shares expenses and revenues with another healthcare delivery organization in the next 12 months?

	Very unlikely	Unlikely	Unknown	Likely	Very likely	Not applicable
Likelihood of entering a joint venture	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Comments?

The Evolving Healthcare Environment: Status and Readiness, 2011

Provision of healthcare services

6. How does your organization arrange for the provision of the following healthcare services for the MAJORITY of your patients?

	Provided by our organization	Provided by other organizations in our health system	Provided by other organizations not associated with our organization	I do not know or not applicable.
Primary care	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Routine specialty care (e.g., orthopedics)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Highly specialized care (e.g., organ transplant)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Urgent/emergent care	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Hospital inpatient care	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Diagnostic ancillary services (e.g., radiology, laboratory)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Therapeutic ancillary services (e.g., physical therapy, rehabilitation)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Custodial ancillary services (e.g., nursing home care, hospice care)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Behavioral health	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Comments?

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Challenges in becoming successful

7. What is the degree of challenge your organization faces in becoming successful in the following aspects of change?

	No challenge	Low challenge	Moderate challenge	Considerable challenge	Extreme challenge	I do not know or not applicable.
Developing physician leadership	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Reducing clinical variation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Developing effective clinical and management information systems	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Creating effective data sharing relationships with payers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Developing and maintaining a common clinical culture	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Aligning incentives to encourage provider productivity while minimizing unnecessary utilization of services	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Reducing internal operating costs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Reducing total costs of care to the payer (including physician, hospital, surgery, imaging, lab, drug, rehab, etc. costs)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Maximizing patient satisfaction	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Providing sufficient primary care resources	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Resolving issues between primary care and specialty physicians	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Making referrals to specialists based upon cost, utilization and quality factors	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Committing the time to start and sustain changes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Other challenges? Comments?

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EHR utilization

8. Does your organization currently use an electronic health record (EHR) for the majority of your patients?

☐ Yes

☐ No

☐ I do not know or not applicable.

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Information system capabilities

9. What is the status of your organization's information system capabilities in each of the following areas?

	Currently have this capability	Do not currently have but intend to have in the next 12 months	No plans to have this in the next 12 months	I do not know or not applicable.
Target high-risk or high-needs patients at risk of hospitalization (e.g., predictive modeling)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
Track clinical referrals or consultations (e.g., referral tracking system)		<input type="radio"/> <input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Electronically exchange clinical information with physicians and hospitals outside your organization		<input type="radio"/> <input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Monitor chronic diseases (e.g., asthma, diabetes) through a disease registry		<input type="radio"/>		
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Provide patients with a clinical summary of each office visit	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Evaluate our provider performance relative to benchmarks	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Comments?	<input type="text"/>			

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Quality measures

10. Does your organization collect the following quality measures?

	Yes, currently collect	No, but intend to collect in next 12 months	No intention to collect in next 12 months	I do not know or not applicable.
Access measures (e.g., waiting times, third next available appointment)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Process measures (e.g., A1c testing 2 times annually)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Clinical outcome measures (e.g., A1c in poor control)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Patient experience measures (e.g., patient satisfaction survey)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
Patient safety measures (e.g., patient falls, catheter-associated UTI)		<input type="radio"/> <input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Preventive health measures (e.g., influenza immunization rate, blood pressure measurement)		<input type="radio"/> <input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Utilization measures (e.g., 30-day hospital readmissions, emergency room use)		<input type="radio"/> <input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Patient reported health outcome measures (e.g., SF 12 health status questionnaire)		<input type="radio"/> <input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Comments?	<input type="text"/>			

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Efficiency measures

11. Does your organization track the following efficiency measures?

	Yes, currently track	No, but intend to track in the next 12 months	No, because we are not able to collect the data	No intention to track in the next 12 months	I do not know or not applicable.
Practice operating cost per full-time-equivalent (FTE) physician	1	1	1	1	1
Practice operating cost per encounter	3	3	3	3	3
Practice operating cost per procedure	1	1	1	1	1
Practice operating cost per patient	3	3	3	3	3
Practice operating cost per work RVU	1	1	1	1	1
Total costs per patient from the payer's perspective (including physician, hospital, surgery, imaging, lab, drug, rehab, etc. costs)	3	3	3	3	3
Total cost of an episode of care from the payer's perspective	1	1	1	1	1
Work RVUs per provider	3	3	3	3	3
Staff production measures (e.g., postings per billing employee)	1	1	1	1	1
Business office operations measures (e.g., collection percentage, days in A/R)		1 3	3	3	3
Comments?					

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Care management processes

12. What is the status of the following care management processes in your organization?

	Process currently exists	Intend to institute this process in the next 12 months	No plans to institute this process in the next 12 months	I do not know or not applicable.
Allow patients to access a provider the same day or when the practice is closed without going to an emergency room or urgent care clinic	1	1	1	1
Provide for care management of high-risk patients	3	3	3	3
Follow up with patient/family who has not kept appointments	1	1	1	1
Ensure that transition from one provider to another is planned, coordinated and documented	3	3	3	3
Utilize care protocols/pathways	1	1	1	1
Provide patient education and support	3	3	3	3
Comments?				

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Payment types

13. Does your organization currently receive the following types of payments?

	Yes	No	I do not know or not applicable.
Fee-for-service payment	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
Care management payment, usually paid in addition to other fees (e.g., patient education and self-management support payment)	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
Fixed fee per capita amount for a fixed time period (e.g., per member per month capitation payment)	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
One combined payment for professional and/or facility services for treating a single episode of care	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
Payment for each day a covered member is hospitalized (e.g., per diem payment)	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
Fixed, pre-established payment for each case (e.g., case rate payment)	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Comments?

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Financial risk

14. Has your organization ever gone through the financial exercise to calculate the per member per month (PMPM) payment you would need to be successful at managing a population of patients?

☒ Yes

☐ No

☐ I do not know or not applicable.

Comments?

15. Has your organization ever gone through the financial exercise to calculate the price you would need to charge for an entire episode of care for a common diagnosis?

☒ Yes

☐ No

☐ I do not know or not applicable.

Comments?

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Incentive payments

16. Does your organization receive the following incentives from payers?

	Yes	No	I do not know or not applicable.
Payment for compliance with quality-based process measures (e.g., reporting percent of diabetic patients with A1c greater than 9.0)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Payment based on treatment outcomes (e.g., % of diabetics whose A1c decreased in past year)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Payment based on reducing utilization of healthcare services (e.g., nonurgent emergency room visits, diagnostic imaging)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Payment based on reducing the total cost of care to the payer (e.g., shared savings)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Payment based on the patient's care experience (e.g., patient satisfaction)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Comments?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

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Patient-Centered Medical Home (PCMH) status

* 17. Which of the following best describes your organization's current PCMH status?

- ☐ I am not familiar with the PCMH concept.
- ☐ Our organization is not eligible to become a PCMH.
- ☐ Our organization is eligible but we are not currently interested in becoming a PCMH.
- ☐ Our organization is instituting changes to become a PCMH.
- ☐ Our organization is a PCMH but is not seeking accreditation.
- ☐ Our organization is a PCMH and is seeking accreditation.
- ☐ Our organization is a PCMH and is accredited.
- ☐ Other

Please describe "Other".

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Patient-Centered Medical Home activities

* 18. Have you or are you currently participating in a public or private PCMH demonstration program or pilot?

- ☐ Yes
- ☐ No
- ☐ I do not know or not applicable.

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Patient-Centered Medical Home patients

19. Estimate how many of your organization's patients are participating in your PCMH demonstration programs and/or pilots.

Number of PCMH patients

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Challenges of establishing a PCMH

20. What is the degree of challenge for the following aspects of establishing a PCMH?

	No challenge	Low challenge	Moderate challenge	Considerable challenge	Extreme challenge	I do not know or not applicable.
Motivating physicians to participate	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Developing physician leadership	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Raising startup capital	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Developing a governance structure	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Evaluating the costs and benefits	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Comments?

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Accountable care status

There are different variations of accountable care-type organizations. For the purpose of this questionnaire, let us define an accountable care organization (ACO) as an organization that has the goal of figuring out how to minimize the total cost of caring for a patient population while still meeting standards for quality of care and patient satisfaction.

* 21. Which of the following best describes your organization's current ACO status?

- ☐ Our organization believes we currently are an ACO or part of an ACO.
- ☐ Our organization is investigating options on how to become an ACO or part of an ACO.
- ☐ Our organization has no intention of becoming an ACO or part of an ACO in the next 12 months.
- ☐ Other

Comments?

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Accountable care participation

22. Have you or are you currently participating in any public- or private-payer-designed ACO pilot programs or demonstration projects?

- ☐ Yes
- ☐ No
- ☐ I do not know or not applicable.

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Accountable care challenges

23. Regardless of your current ACO status, what do you feel is the degree of challenge for the following aspects of establishing an ACO?

	No challenge	Low challenge	Moderate challenge	Considerable challenge	Extreme challenge	I do not know or not applicable.
Motivating physicians to participate						
Developing physician leadership						
Raising startup capital						
Developing a governance structure						
Evaluating the costs and benefits						

Comments?

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Practice specialty

24. Which of the following best describes your practice specialty?

Multispecialty with primary and specialty care	Ob/gyn: maternal / fetal medicine	Physiatry
Multispecialty with primary care only	Ob/gyn: reproductive endocrinology	Podiatry
Multispecialty with specialty care only	Occupational medicine	Psychiatry
Allergy / immunology	Ophthalmology	Pulmonary medicine
Anesthesiology	Ophthalmology: retina	Radiation oncology
Anesthesiology: pain management	Orthopedic surgery	Radiology
Cardiology	Otorhinolaryngology	Radiology: nuclear medicine
Critical care: intensivist	Pathology	Rheumatology
Dentistry	Pediatrics	Surgery: cardiovascular
Dermatology	Pediatrics: allergy / immunology	Surgery: colon and rectal
Dermatology: Mohs surgery	Pediatrics: cardiology	Surgery: general
Emergency medicine	Pediatrics: child development	Surgery: neurological
Endocrinology / metabolism	Pediatrics: clinical and lab immunology	Surgery: oncology
Family medicine	Pediatrics: critical care / intensivist	Surgery: oral
Gastroenterology	Pediatrics: emergency medicine	Surgery: pediatric
Genetics	Pediatrics: endocrinology	Surgery: plastic / reconstructive
Geriatrics	Pediatrics: gastroenterology	Surgery: thoracic
Hematology	Pediatrics: genetics	Surgery: transplant
	Pediatrics: hematology / oncology	Surgery: trauma

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- | | | |
|---|---|---|
| <input type="checkbox"/> Hospitalist | <input type="checkbox"/> Pediatrics: hospitalist | <input type="checkbox"/> Surgery: vascular |
| <input type="checkbox"/> Infectious disease | <input type="checkbox"/> Pediatrics: infectious disease | <input type="checkbox"/> Urgent care |
| <input type="checkbox"/> Internal medicine | <input type="checkbox"/> Pediatrics: nephrology | <input type="checkbox"/> Urology |
| <input type="checkbox"/> Neonatal medicine | <input type="checkbox"/> Pediatrics: neurology | <input type="checkbox"/> Other |
| <input type="checkbox"/> Nephrology | <input type="checkbox"/> Pediatrics: pulmonology | <input type="checkbox"/> Organization is not a medical practice |
| <input type="checkbox"/> Neurology | <input type="checkbox"/> Pediatrics: rheumatology | |
| <input type="checkbox"/> Ob/gyn | <input type="checkbox"/> Pediatrics: sports medicine | |
| <input type="checkbox"/> Ob/gyn: gynecological oncology | | |

Please describe "Other."

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Practice size

25. How many full-time-equivalent (FTE) physicians work for your organization?

Number of FTE physicians

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Practice location

26. In which state is your organization located?

- | | | |
|---|---|---|
| <input type="checkbox"/> Alabama | <input type="checkbox"/> Kentucky | <input type="checkbox"/> North Dakota |
| <input type="checkbox"/> Alaska | <input type="checkbox"/> Louisiana | <input type="checkbox"/> Ohio |
| <input type="checkbox"/> Arizona | <input type="checkbox"/> Maine | <input type="checkbox"/> Oklahoma |
| <input type="checkbox"/> Arkansas | <input type="checkbox"/> Maryland | <input type="checkbox"/> Oregon |
| <input type="checkbox"/> California | <input type="checkbox"/> Massachusetts | <input type="checkbox"/> Pennsylvania |
| <input type="checkbox"/> Colorado | <input type="checkbox"/> Michigan | <input type="checkbox"/> Rhode Island |
| <input type="checkbox"/> Connecticut | <input type="checkbox"/> Minnesota | <input type="checkbox"/> South Carolina |
| <input type="checkbox"/> Delaware | <input type="checkbox"/> Mississippi | <input type="checkbox"/> South Dakota |
| <input type="checkbox"/> District of Columbia | <input type="checkbox"/> Missouri | <input type="checkbox"/> Tennessee |
| <input type="checkbox"/> Florida | <input type="checkbox"/> Montana | <input type="checkbox"/> Texas |
| <input type="checkbox"/> Georgia | <input type="checkbox"/> Nebraska | <input type="checkbox"/> Utah |
| <input type="checkbox"/> Hawaii | <input type="checkbox"/> Nevada | <input type="checkbox"/> Vermont |
| <input type="checkbox"/> Idaho | <input type="checkbox"/> New Hampshire | <input type="checkbox"/> Virginia |
| <input type="checkbox"/> Illinois | <input type="checkbox"/> New Jersey | <input type="checkbox"/> Washington |
| <input type="checkbox"/> Indiana | <input type="checkbox"/> New Mexico | <input type="checkbox"/> West Virginia |
| <input type="checkbox"/> Iowa | <input type="checkbox"/> New York | <input type="checkbox"/> Wisconsin |
| <input type="checkbox"/> Kansas | <input type="checkbox"/> North Carolina | <input type="checkbox"/> Wyoming |

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Position title

27. What title best describes your position?

- | | |
|--|--|
| <input type="checkbox"/> Physician chief executive officer (CEO) / President | <input type="checkbox"/> Finance director / manager |
| <input type="checkbox"/> Medical director / Chief medical officer (CMO) | <input type="checkbox"/> Human resources director / manager |
| <input type="checkbox"/> Physician | <input type="checkbox"/> Information systems director / manager |
| <input type="checkbox"/> Chief executive officer (CEO) / executive director | <input type="checkbox"/> Laboratory director / manager |
| <input type="checkbox"/> Administrator | <input type="checkbox"/> Managed care director / manager |
| <input type="checkbox"/> Chief financial officer (CFO) | <input type="checkbox"/> Marketing director / manager |
| <input type="checkbox"/> Chief information officer (CIO) | <input type="checkbox"/> Medical records director / manager |
| <input type="checkbox"/> Chief operating officer (COO) | <input type="checkbox"/> Quality / patient safety director / manager |
| <input type="checkbox"/> Associate / assistant administrator | <input type="checkbox"/> Radiology / imaging director / manager |
| <input type="checkbox"/> Ambulatory / clinical services director / manager | <input type="checkbox"/> Research director / manager |
| <input type="checkbox"/> Branch / satellite clinic director / manager | <input type="checkbox"/> Office manager |
| <input type="checkbox"/> Business office director / manager | <input type="checkbox"/> Accounting / consulting firm principal |
| <input type="checkbox"/> Compliance director / manager | <input type="checkbox"/> Consultant |
| <input type="checkbox"/> Department administrator / director / manager | <input type="checkbox"/> Other |

Please describe "Other".

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Comments

28. Here is an opportunity to provide any final comments or perspectives about the evolving healthcare environment.

For healthcare consulting, legal and accounting firm respondents, you are not eligible to respond to most of the questions on this questionnaire. This page is your only opportunity to comment on the topic of the evolving healthcare environment.

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Contact information

All responses are confidential. Your identity will not be published or released without your permission.

Contact information will be used to notify you when the results are available for download and might also be used to enable MGMA staff to contact you about your response.

29. Your name

30. Your organization's name

31. Your e-mail address (required if you would like the link to the research results to be e-mailed to you)

32. Your telephone number

33. What is your MGMA member ID number? If you do not know or are not an MGMA national member, click "Next."

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Thank you

Thank you for participating in this study.

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BIOGRAPHY

Douglas Anderson has been a healthcare administrator for over 35 years. He received his Master's degree in Health Administration from Duke University, and began a career engaged in numerous healthcare organizations. His senior management positions have included serving as the CEO in both single specialty and multi-specialty medical group practices, Executive Director of a management services organization, and as an Administrative Director in a multi-hospital healthcare system. His support of the profession of healthcare management includes life membership in the Medical Group Management Association, and he is a Life Fellow in the American College of Medical Practice Executives. Subsequent to his medical management career, Douglas became involved in the training of future healthcare managers and leaders. He is a part-time member of the faculty in the Department of Health Services Management and Leadership in the Milken Institute School of Public Health The George Washington University. His teaching responsibilities include courses in Ambulatory Care Management, Introduction to Management and Economics in Healthcare, Healthcare Policy Analysis, and Management Approaches to Public Health. His community service activities include service on the Board of Directors of Neighborhood Health, Inc., a Federally Qualified Health Center in Northern Virginia, working with a local non-profit, ALIVE, to help operate the Last Saturday food distribution program, and working with the Appalachian Service Project to provide housing improvement in southern West Virginia.