Key Attributes in Obtaining Better Outcomes and Reduced Costs in the Healthcare System

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Dedication: To my family, friends, and mentors who have always encouraged and supported me in my endeavors.

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Abstract

Objective/Hypothesis: The United States does not universally produce optimal levels of healthcare delivery, however, there are pockets throughout the country where organizations have utilized innovative strategies to produce high-value healthcare (better outcomes at lower costs). Our project aimed to identify factors that result in, or impede, the delivery of high-value healthcare. We hypothesized that there are common factors assisting or inhibiting organizations from producing high-value healthcare.

Methods: We performed an analysis of innovative delivery models utilized at 10 different healthcare organizations throughout the country. The analysis included a literature search pertinent to each innovation we selected, a telephone interview with executives at the organization, integration of information we obtained into a pre-established template, a follow-up questionnaire, and finally an integration of new data from the questionnaire.

Results: 10 different enablers were found to be common among the organizations. These included: *shared vision, provider leadership, front-line empowerment, defined population, patient centeredness, co-creation with customer, information technology, culture of learning, presence of a willing payer, and a clear business case*. The organizations ranked **provider leadership** and **shared vision** to be the two most important enablers. Three common barriers to success were found among the organizations and included *government regulations, provider culture, and reimbursement.* **Provider culture** was assessed as the most important barrier to overcome in the follow up questionnaire.

Significance*:* The United States spends more overall and more per capita than any other country on healthcare, yet we are ranked 37th in the world for healthcare performance on average.[1] Moreover, there is significant variability in mortality rates, access, safety, and patient satisfaction throughout the country.[2] The information from this study provides a better understanding of how effective organizations are producing higher value healthcare and may act as a roadmap for organizations actively looking to produce better outcomes while lowering their costs.

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Introduction/Significance

Background

Evolution of medicine, health insurance, and provider reimbursement

In the early 1900s the world of healthcare was vastly different than what we are accustomed to today. Medical knowledge and treatment options were diminutive comparatively. The average American was more concerned about the loss of wages from illness than they were about costs associated with healthcare. In fact, most people felt they needed "sickness" insurance (similar to our current day disability insurance) over health insurance. Physicians received compensation directly from patients based on what they could pay whether it was financially or through trade. This would not last forever though as dramatic changes to the world of healthcare began to occur in the following years.[3]

Led by the allopathic medical discipline, medicine began to transform into a scientific community that offered standards of care and proven treatments. After the release of Flexner's analytical report in 1910, medical education began to elevate their admittance standards and licensure/accreditation became more stringent. These factors contributed to a smaller more specialized (ophthalmology became the first medical specialty in 1916) workforce that increased the cost of their services. Additionally, more healthcare services such as antibiotics, insulin, and imaging became available and people began taking advantage of this more expansive, yet specialized healthcare system. In doing so, they increased the amount of dollars going into this industry and thus the cost of healthcare rose.[3, 4]

In the early 1900s, the population began to migrate to urban environments and as hospital utilization increased the idea of health insurance proliferated. Blue Cross was formed in the 1930s as a non-profit health insurance organization that provided hospital benefits. Soon after Blue Cross was founded, Blue Shield was established to provide physician services. Noticing the success of Blue Cross and Blue Shield, commercial insurance companies began delving into the healthcare field. Amidst WWII, wage and price controls set on employers launched the concept of healthcare insurance as an employee benefit that could attract and hold onto key workforce employees. Then, in the mid 1960s after many failed attempts, the government was able to enter health insurance market by passing legislation for Medicare and Medicaid. These key milestones set the foundation for our current medical insurance system, one in which the direct patient to doctor payment arrangement has effectively been eliminated. This is a system that some say has contributed to our drastic increase in healthcare costs.[3]

Although the US still lacks universal coverage, a recent Commonwealth Fund report states that in 2010 nearly 84% of the US population was covered either through private, primarily employer-based plans (56%) or public programs like Medicaid, Medicare, and the military health programs (27%). The remaining 16% were uninsured Americans and undocumented immigrants (who are generally not eligible for public assistance). While health insurance benefit packages vary by type of insurance, low cost-sharing requirements and lack of price transparency significantly limit patient exposure to the true cost of care. This trend is increasing as out-of-pocket expenses for individuals has decreased from 23% to 11% since 1980.[5]

The nature of provider reimbursement is set primarily by government payers, Medicare and Medicaid, which account for nearly 40% of physician and hospital services.[6] Since their inception in 1965, both programs have paid providers primarily on a fee-for-service basis without any reference to the quality (outcomes, safety, service) of care received. Moreover, the already low levels of reimbursement and per-unit-of-service price controls imposed by government payers have created a system that incentivizes the overuse of services and procedures. Other models, such as capitation, exist but have been slow to be adopted on a broad level.

In addition to emphasizing volume over value, payments for most healthcare services are negotiated and distributed in silos. Hospital payments are based on Diagnostic Related Groups (DRGs), while nursing homes receive per diem payments, and most physicians are in fee-for-service arrangements. In fact, a patient admitted to the hospital for a specific procedure (e.g., knee replacement) will likely be billed separately for labs and other diagnostic procedures, physician services, hospital, rehabilitation services, etc. This fragmentation in reimbursement provides no financial incentives for the various parts of the care system to work together and create better value. Finally, federal and state regulations not only dictate the scope of practice for healthcare providers, but also the settings in which they can be reimbursed. Perhaps this is why a number of innovations in US healthcare delivery have either focused on the uninsured (where government oversight is limited) or required providers to go at risk with an insurance plan to create better system alignment and provide flexibility to test new models of care.[7]

Current state of healthcare in the United States

Similar to a person suffering from a debilitating disease, healthcare delivery in the United States is ailing. The United States spends an unprecedented $2.7 trillion annually on health care, approximately 75% of which is on chronic disease.[8] This equates to more dollars spent per capita on healthcare than any other country in the world, yet we are ranked 37th in the world for healthcare performance.[1,2] We have variable access to healthcare and are one of the only developed countries without universal coverage. Our system has problems with patient safety as evidenced by the Institute of Medicine report in 2000 that stated avoidable medical errors contributed to 44,000-98,000 annual deaths in the U.S.[9] In addition to mortality, medical errors significantly increase the costs of healthcare; an estimated $4.4 billion was wasted by Medicare in 2008 alone.[2] Medical technology increases the cost of healthcare and we utilize more medical technology than any other country in the world, much of which is not evidence-based.[2]

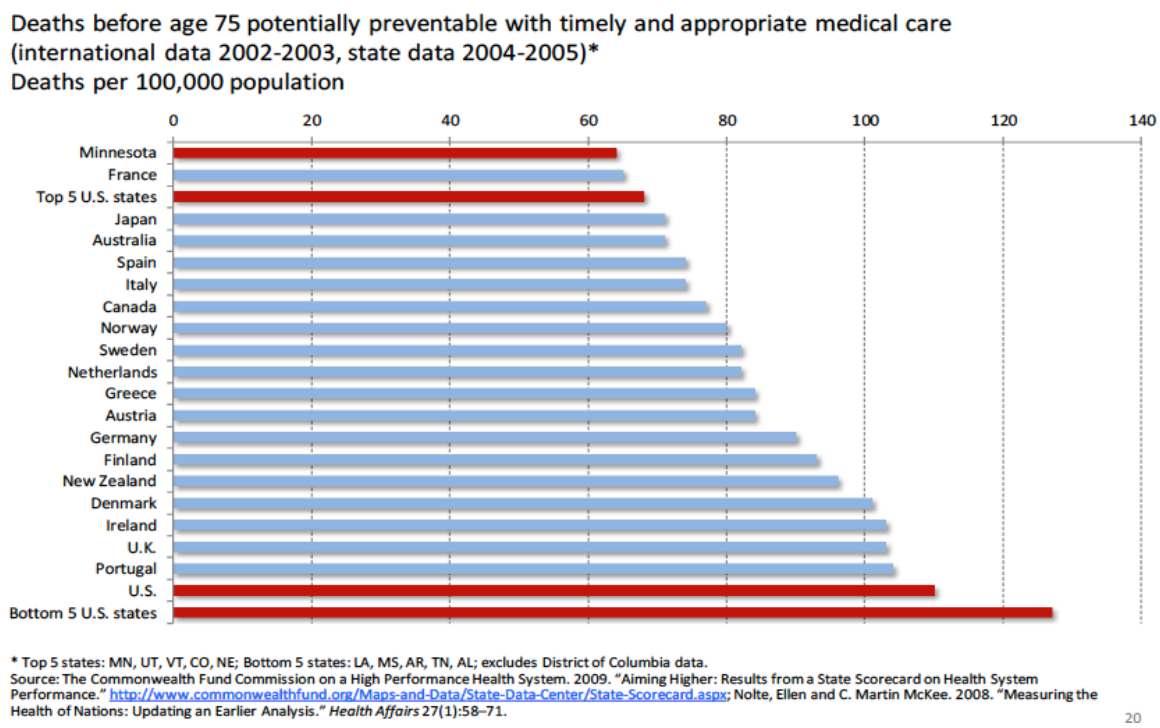
From 1970 to 2005 healthcare costs in the United States rose approximately 2.5% more than the rise in GDP every year. As of 2011 17.9% of our GDP was spent on healthcare, compared to the next highest country, Netherlands at 12.0%. There have been numerous studies trying to understand why our costs are so much more expensive than other countries. Is it because of technology, defensive medicine, administration costs, an aging population, access to care, reimbursement policies, utilization rates, a higher average income, etc.? The studies have been inconclusive on the actual cause of our enormous costs as our utilization levels are not significantly higher than other countries and many of the factors mentioned above account for only a minimal percent of our total costs. One thing is certain; there are multiple factors and we are not currently getting the optimal return on our investment.[10, 11, 12]

Another issue the United States faces is that the current reimbursement systems are varied and most, such as fee-for-service, are not aligned with high-value healthcare. The number of citizens on Medicaid has increased from 1 in 50 when it was initiated to 1 in 6 in 2011 and the Affordable Care Act plans to increase the number of citizens on Medicaid.[2] When Medicare was established 1 in 10 Americans utilized it, now 1 in 7 do.[2] This number will only increase with an aging population and this is the group who utilize the majority of healthcare dollars. These increases in participation/costs of Medicare and Medicaid come without addressing the necessary increase in revenue to finance them, setting the United States on an unsustainable trajectory.

If we remain on the current path and do not rectify the multiple factors contributing to our poor performance, then healthcare along with other unfunded liabilities will financially bankrupt the U.S. We are at another critical juncture in the history of healthcare and must find ways to deliver better quality while minimizing costs in order to prevent a colossal disaster.

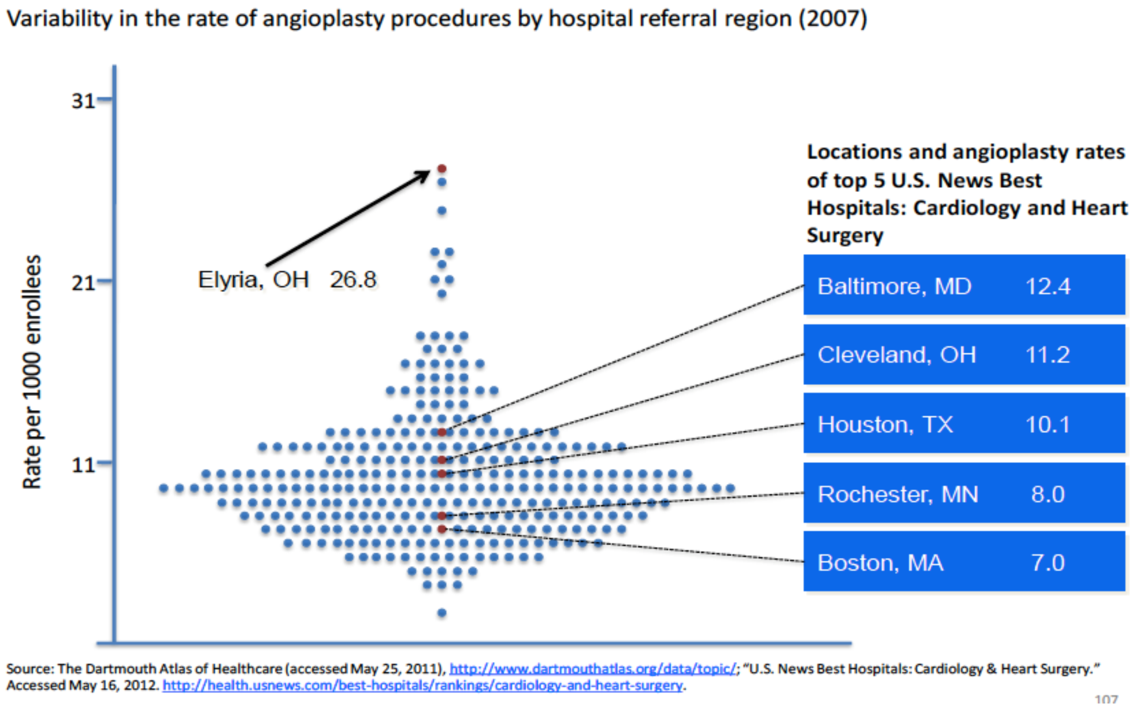
This raises the question, are all healthcare organizations in the country failing to produce high-value healthcare? The answer is absolutely not. There is significant variability in regards to outcomes, utilizations, costs, etc. throughout the country. As one example based on preventable mortality, Figure 1.1 below, shows that on average the U.S. is inferior to other countries, however the top 5 U.S. states (MN, UT, VT, CO, NE) are doing very well relative to the rest of the world, with Minnesota leading the group. On the opposite spectrum, the states of LA, MS, AR, TN, and AL are at the very bottom of list.

Figure 1.1: Example of outcome variability within the U.S.[2]



Another example of variability can be seen in Figure 1.2 below, which provides a snapshot of differences among rate of angioplasty procedures by hospital referral regions in the U.S. It helps demonstrate that the type of care you receive is not consistent across the country, with higher rates of angioplasty in places like Elyria, OH as compared to Boston, MA. The data has taken into account confounding factors and represents actual practice patterns in these regions.

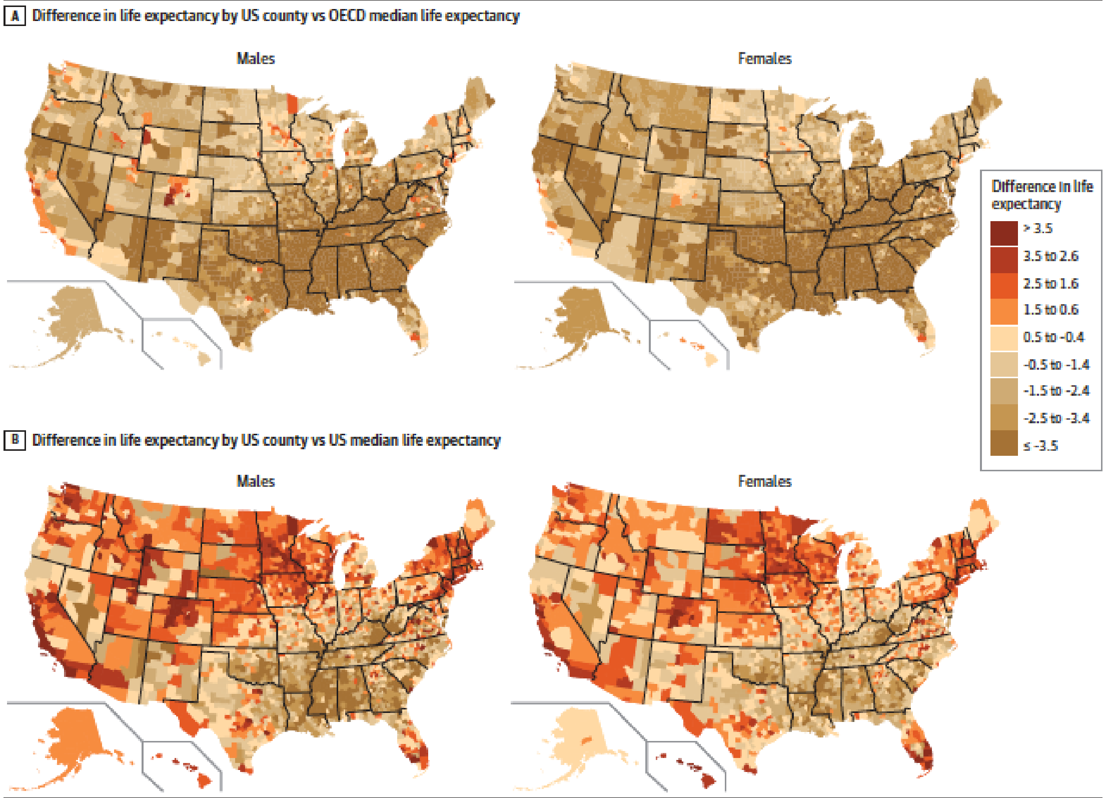
Figure 1.2: Example of utilization variability within the United States[2]



One final example of variability was published recently in a Journal of the American Medical Association (JAMA) that delved into the anatomy of healthcare in the U.S. Figure 1.3 shows that life expectancy is highly wide-ranging across different segments of the country.

Figure 1.3: Example of life expectancy variation in the country.[13]

Figure 11. Difference in Life Expectancy by US County vs OECD Median Life Expectancy and US Median Life Expectancy, 2010[a]



Data on life expectancy at birth by US county in 2010 are from the Institute for Health Metrics and Evaluation.[35] Data on life expectancy at birth in Organisation for Economic Cooperation and Development (OECD) high-income countries in 2010 are from the OECD Health Statistics Library.[36] The difference in US county life expectancy from the US median county life expectancy and OECD median country life expectancy was calculated by sex for each county.

[a] OECD median life expectancy is the median life expectancy of OECD high-income countries.[36] US median life expectancy is the median value for all counties in the United States as reported by the Institute for Health Metrics and Evaluation.[35]

We know there are healthcare organizations that have taken the initiative upon themselves and are providing high-value care in our country. Statewide and national institutions have been established over recent years, such as the Center for Medicare and Medicaid Innovation that are aimed at finding innovative solutions to healthcare.[14] The mentality of health policy leaders is aligning with improvement as demonstrated by recent CMS director Dr. Berwick, "the United States will not achieve high-value health care unless improvement initiatives pursue a broader system of linked goals."[15]

With mindsets and goals becoming more focused on high-value care, there have been publications addressing innovations that have improved value in healthcare. These publications set a good foundation for our team, but through our project we aim to find the specific factors that have enabled organizations to deliver high-value healthcare. By identifying and ranking the common factors that enable organizations to implement successful practices at the local level then we hope to offer a set of solutions that can be applied broadly to those organizations delivering low-value care and drive positive transformation of our nation's healthcare delivery.

Impact

This project strives to impact the healthcare field in a broad sense. We didn't seek out to solve any one issue; however we strove to look at the larger picture in hopes that its effects could be utilized across the United States by healthcare providers of all types. This was a conscious decision we made early on in our conduction of this project. With that said, some of the specific areas we feel this project could provide assistance are the following:

1) Improved outcomes: As mentioned above, value entails improved outcomes meaning patients having quicker recoveries, less complications, lower mortality rates, increased patient satisfaction, less medical errors, better quality of life, etc. The organizations we analyzed were able to achieve improved outcomes and we believe the common factors we found will help enable healthcare providers to improve their outcomes.
2) Reduction in healthcare spending: At the core of our project was finding innovative solutions that improved value, meaning *lower cost* with improved outcomes. Each of the organizations we researched had an innovation that was able to succeed in doing this. Most people are aware that healthcare costs are increasing exponentially, even healthcare legislation is titled after reducing costs, "Affordable Care Act." If put into

practice we hope the results of this project will enable healthcare organizations to lower their costs of delivering care.

3) Outline for providing high-value care through innovation: Perhaps the greatest impact this project will have is providing a resource for those providers looking to utilize an innovative solution to approach an area of concern their organization is facing. By selecting organizations that tackled a wide range of problems, we believe this information could be used by a number of providers. Ultimately, most in the healthcare field are enticed by delivering better care at lower costs, but many may be ill-equipped with the knowledge to perform this difficult task.

Aim(s)/Goal(s)/Hypothesis

The overarching goal of this project is to identify key factors that lead to the delivery of high value healthcare. This goal was accomplished by pursuing the following aims. The first aim was to identify the individual factors that enable(d) a given healthcare organization to develop, implement, and maintain an innovative delivery model to produce higher value healthcare. For example, was it the organization's location, surrounding population, reimbursement/financial incentive strategy, strong leadership presence, etc? The second aim was to isolate common elements that allowed or prevented delivery of high-value care by comparing the data collected in the first aim across the organizations. The third aim was to delineate which common enablers were most critical and which common barriers were most important to overcome in order to achiever higher value.

We hypothesize that there are common key factors that either enable or hinder the ability of an organization to provide high value healthcare.

Research Materials and Methods

Organization Selection

Over thirty different organizational innovations were discussed at the initiation of this project that could potentially be researched. Dr. Cortese introduced the majority of these as possibilities based on his 6 years of serving as the Institute of Medicine Chair of the Value and Science Driven Round Table, which provided him ample opportunities to collaborate with fellow health care leaders on new models of care that were resulting in higher value care. We sought to narrow our list down to only 10 organizations to make the research more feasible. This was achieved by establishing inclusion criteria that intended to compile a cohort composed of successful organizations having a wide range of variability in their genetics. Variability was necessary to obtain a set of solutions that would be applicable to any type of healthcare organization. The selections focused on having many of the following criteria:

- Longevity to demonstrate successful measurable outcomes
- A sustainable business model
- An innovation that lowered costs of care delivery
- Population focus (i.e. urban vs. rural)
- Practice type (i.e. chronic disease vs. acute, academic vs. community based)
- Type of innovation (i.e. delivery process vs. health information exchange).

Utilizing this criteria in addition to our team's combined experience in the field we arrived at the following ten organizations to be researched:

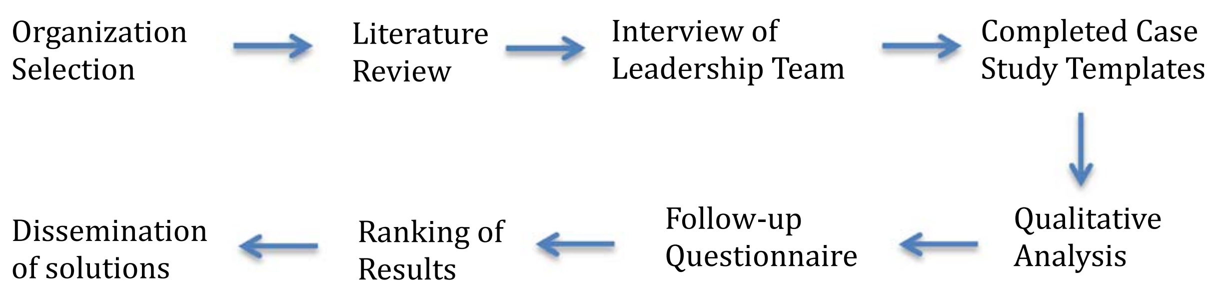
1) Banner Good Samaritan iCare (Phoenix, AZ)
2) Camden Coalition of Healthcare Providers (Camden, NJ)
3) CareMore Medical Group (Southwest United States)
4) Institute for Clinical Systems Improvement (Minnesota)
5) Integrated Care Collaboration (Central Texas)
6) North Texas Specialty Physicians (North Texas)
7) Physician Group Practice Demonstration (Across the United States, mostly eastern)
8) Presbyterian Healthcare Services (Albuquerque, NM)
9) Rocky Mountain Health Maintenance Organization (Grand Junction, CO)
10) Virginia Mason Medical Center (Seattle, WA)

Data Collection/Analysis

We began data collection by conducting literature searches regarding the innovative system implemented by each organization. We also conducted interviews, following an interview guide we developed that asked specific and overarching questions, with the leadership team involved with each innovation. Once all the information was collected, we utilized a defined template that was developed for this type of project by a team out of the Netherlands (Exhibit 1) to input our findings. Based on these findings we delineated the most common factors that enabled or inhibited an organization from achieving their defined level of success. A common factor was one that occurs in 3 or more of the organizations profiled. We then sent out a follow-up survey asking each organization to specify the level of importance for each factor. Using the results from all 10 organizations we were able to average the level of importance for each factor, thus deriving a numerical relationship of importance for enablers and barriers.

Figure 1.4 below provides a graphic demonstrating the methods of our research from organization selection to dissemination of solutions.

Figure 1.4 Flowchart depicting the approach of this project



Results

An extract from each of the 10 organizations researched is given below depicting each innovation analyzed.[16-55]

Banner Good Samaritan iCare

Banner Health is deeply committed to its mission *to make a difference in people's lives through excellent patient care. In support of its mission Banner routinely invests in technology, people, and processes to deliver excellent patient* care. One such investment is iCare Intensive Care, which acts as a high-tech patient safety net that provides proactive ICU care by monitoring for adverse trends. If a change is detected, iCare specialists communicate directly with bedside ICU teams to help determine what the patient needs. The timely responses have improved patient outcomes (ICU mortality down 31%) and reduced resource use (ICU days down 30%).

Camden Coalition of Healthcare Providers

In 2002, a small group of Camden primary care providers began meeting to discuss the problems they faced practicing in the city. They quickly realized that the issues raised were common and familiar to all. Thus, the Camden Coalition of Healthcare Providers was established as an independent non-profit organization with a mission *to improve the quality, capacity, and accessibility of the healthcare system for vulnerable populations in Camden, NJ.* Building relationships across the healthcare provider community and guided by the Camden Health Database, the Coalition was able to launch several health initiatives to improve care delivery and patient outcomes.

CareMore Medical Group

CareMore Medical Group was established in 1993 by Dr. Sheldon Zinberg. He was disgruntled with the bureaucracy in the healthcare system and envisioned an integrated delivery system that provided innovative healthcare approaches to the complex problem of aging by prolonging active and independent life while minimizing costs. To fulfill this mission, CareMore established a model that comprises a network of doctors, nurses, therapists, trainers and other healthcare professionals who focus on personalized preventative medicine. Their capitated reimbursement system, Medicare Advantage, encourages the development of innovative models to keep patients healthy such as offering free transportation for office visits, in-home evaluations, wound care nurses, and physician “extensivists.” Results have been impressive: hospitalization rates 24% below the national average, 38% shorter hospital stays, diabetic amputation rates 60% below average, 97% patient satisfaction, all while reducing member costs by 18%.

Institute for Clinical systems Improvement

The Institute for Clinical Systems Improvement (ICSI) was established in 1993 in response to a request from an employer coalition, which wished to purchase care from the equivalent of an integrated care delivery system throughout the state. ICSI’s primary role was to develop and implement practical, evidence-based care guidelines to reduce practice variation and improve the value of care across this network. Since 1993, the organization has grown to include 55 medical groups representing ~85% of Minnesota physicians, and Minnesota became the first state in the nation where medical care was built around the systematic use of evidence-based best practices.

Integrated Care Collaboration

Established in 1997, the non-profit alliance of Central Texas healthcare providers is dedicated to collection, analysis, and sharing of health information with the goal of improving access and quality of care for the uninsured, underinsured, and other medically underserved residents of Central Texas. The alliance owns, maintains and operates a regional Health Information Exchange to create programs that improve health outcomes for the above populations. Through a number of programs, the alliance has enabled over 37,000 patients to access care through federal, state and local funding programs. Additional community-wide initiatives focus on providing coherent, standardized approaches to patient case and disease management.

North Texas Specialty Physicians

North Texas Specialty Physicians (NTSP) is an Independent Physician Association (IPA) meeting the demands of today’s highly technical and complex medical environment thanks to a decision in 2006 to develop a health information exchange (HIE) under their newly formed subsidary, Sandlot Solutions. The idea was simple, a patient-centric electronic medical record designed by physicians that allowed them to “follow patients in real time, make fast, safe decisions, eliminate redundancy, and improve care quality” per Sandlot CMO Dr. Thomas Deas Jr. Over the past 6 years Sandlot has expanded to include such components as Sandlot Connect which acts as the HIE & master patient index, Sandlot Dimensions which acts as a data warehouse, Sandlot Metrix which acts as a data and analytics toolset, and Sandlot Care Manager which acts as a care management tool. NTSP providers are able to utilize these resources to obtain up to date accurate clinical information about their patients, electronically prescribe medications or tests, and ensure that quality measures are being met during that visit. A recent survey by the eHealth Initiative demonstrated costs savings due to increased efficiency of staff time, decreased redundant testing, reduced medications errors, and decreased cost of care for chronic care patients. Additionally, they report positive impact on physician practices secondary to improved access to tests, improved quality of practice life, and more efficient staff.

Physician Group Practice Demonstration

In April 2005, the Centers for Medicare and Medicaid Services initiated the Physician Group Practice demonstration, which offered 10 practices the opportunity to earn performance payments for improving the quality and cost of healthcare delivered to Medicare fee-for-service beneficiaries. Participating groups were eligible for up to 80% of any savings they generated if they were also able to demonstrate improvement on 32 quality measures. All organizations met quality benchmarks and some achieved sufficient savings to receive bonus payments. Performance heterogeneity across participating sites underscores the importance of timely evaluation of payment reforms and better understanding factors that lead to either success or failure in effecting changes in healthcare practices.

Presbyterian Healthcare Services

Presbyterian Healthcare Services is an integrated system based in Albuquerque, New Mexico with eight hospitals, the state's largest health plan, and a medical group. In 2007 they found themselves needing to address the issues of an aging population with chronic diseases and future overcapacity in their hospitals. Their answer lie in a Hospital@Home model developed by Dr. Bruce Leff of John Hopkins University Schools of Medicine and Public Health. After nine months of planning and implementation, the program was launched in 2008. Through lower average length-of-stays and reduced numbers of testing, they have had costs savings of 19% compared to similar patients in the hospital acute care. Moreover, patients show comparable or better clinical outcomes compared with similar inpatients, and they report higher satisfaction levels.

Rocky Mountain Health Maintenance Organization

In 1974 a small group of Grand Junction physicians founded the Rocky Mountain Health Maintenance Organization (HMO) to ensure that Medicaid patients would not be denied care because of low Medicaid payments. The HMO, now part of the statewide Rocky Mountain Health Plans, enrolled both Medicaid members and others, and through a system of cross-subsidies, paid physicians standard fees regardless of the insurer. To contract with the HMO, physicians formed the Mesa County Physicians Independent Practice Association (IPA), which monitors quality and supports primary care. Through the IPA, practicing physicians undergo on-site chart reviews by a two-doctor team to evaluate their performance every two years. Outcome and cost data on all IPA members are made available to their colleagues. The IPA also collects physician payments from the HMO and sets policy for how those funds are distributed. For example, it has long adjusted fee schedules to pay a little less than usual rates for surgical procedures and a little more for primary care visits. IPA members receive additional end-of-year payments if the HMO's overall health care costs go down or if members' performance improves. When health care costs for Medicare patients during their last two years of life are compared for U.S. localities, the Grand Junction Hospital Referral Region is the only one that has ranked among the five lowest-cost regions ever since the *Dartmouth Atlas of Health Care* began compiling such data in the early 1990s.

Virginia Mason Medical Center

Virginia Mason Medical Center (VMMC), an integrated healthcare system in Seattle, was approached by the medical director of Aetna in 2004 seeking a solution to rising healthcare costs. Recognizing an opportunity to apply their Toyota based lean delivery model, Drs. Robert Mecklenburg and Gary Kaplan worked with Aetna and their clients (large self-insured employers) to address this problem. Their mission was to offer better, faster, and more affordable care. To accomplish this objective they identified appropriate clinical conditions to address, streamlined treatment protocols, established measurement criteria, and aligned reimbursements accordingly. This process resulted in what is now known as the Marketplace Collaboratives, which consist of evidence-based streamlined treatment regimens for diagnosis such as low-back pain, headaches, breast conditions, and others. By measuring quality indicators they have seen reduction in non-value added care, decreased costs, increased patient satisfaction, and faster return to work times. This collaboration has allowed VMMC, employers, and health plans to align goals to achieve "quality" care.

Analysis of these innovations across the United States, revealed 10 innovation enablers and 3 major barriers (see below). It should be noted that while not all of the observations listed apply directly to each innovation, most are true for all of the innovations analyzed.

Key enablers

1. Shared vision: The existence of a clear, shared vision helps organizations strive toward innovative care that is patient centered, safe, effective, efficient, timely, and equitable. The "shared" component ensures that this aim for high value care permeates all levels of the organization and creates alignment across all of the care providers.
2. Provider leadership: The majority of innovations profiled were initiated by an individual provider or a group of providers, and the success was highly dependent on strong provider leadership. A clinician leader benefits from clear visibility into the care processes and organizational dynamics, and commands the respect of other providers (more so than a non-clinician leader).
3. Front-line empowerment: Studies show that engaged employees tend to be more productive and more likely to contribute toward achieving greater organizational goals. The innovators profiled are clearly attuned to the key drivers of employee engagement, having one's ideas valued and understanding how one's work contributes to the overarching mission of the organization. Employees are given ample opportunities to lead, identify areas in need of improvement, and are supported by a variety of tools to help them translate their ideas into reality.
4. Focus on a defined population of patients: Nearly all of the interventions profiled began with a focus on a given subset of high-need, high-cost patients (e.g., ICU patients, frail elderly). This focus allows organizations to achieve rapid and significant improvements in both patient outcomes, as well as overall costs. It subsequently frees up resources to maintain or improve not only the health of the original patient population, but also other patients under the care of a given organization.

5. Patient-centeredness: The focus on the need of an individual patient is a cultural aspect and a professional attitude that cannot be underestimated. It is a key characteristic of all the innovators and often dictates both the structure and the business model of the organization/ innovation. A number of innovators interviewed stated that the litmus test for their innovation was a positive response to the question: Would I want this type of care for my family members?
6. Co-creation with the customer: Successful implementation of an innovation is highly dependent on a clear understanding who the "customer" is (e.g., the patient, the provider, the payer), their needs, preferences, and constraints. Engaging the "customer" throughout the innovation development process not only leads to a better product/ intervention, but significantly improves the odds of long-term success.
7. Information technology infrastructure: Information is key to providing safe and effective ongoing care for all patients, and it is mandatory if we are to generate knowledge. As highlighted by Banner Health, hospitals that invest in IT systems can improve quality by reducing adverse trends while lowering overall treatment costs. The key is the development and use of IT systems that do not simply re-create an electronic version of paper-based records, but rather help streamline business operations, while providing meaningful clinical decision support both at the point of care, as well as across the patient population served.
8. Culture of learning and continuous improvement: In all of the organizations analyzed, professionals are expected to go beyond mastering a basic body of knowledge, completing an apprenticeship, and practicing. They are expected to expand their knowledge through perpetual education, pass on the knowledge through teaching or mentoring, and add to the body of knowledge through research.
9. Presence of an active and willing payer: As a result of their purchasing power, payers, whether in the guise of a self-insured employer (e.g., ICSI, Virginia Mason), an integrated payer-provider organization (e.g., CareMore), the government (e.g., PGPD), are in a key position to significantly affect the quality and productivity of the delivery system.
10. Clear business case: All of the innovations analyzed were started under the premise that the new tool/ model of care will result not only in improved quality of care, but also in improved efficiency and effectiveness, thus offsetting the cost of the innovation. Some of

the business cases are based on a cost-avoidance model by providing an intervention that reduces downstream costly care (i.e. CareMore Medical Group), but are only viable under a payment model that rewards higher value care.

Key barriers

1. Reimbursement for healthcare services: The fragmented and primarily fee-for-service (FFS) structure of reimbursement tends to penalize innovators for increasing efficiency and does not recognize improved effectiveness. As a result of this structure, the majority of financial upside of providing higher value care tends to accrue to the payer and thus can effect provider motivation to participate in an innovative model of care. For example, even if a provider organization receives a bonus for participation in a high-value network and achieving specific outcome goals, if the improvement results in lower demand for services, the FFS incentives have the potential to undermine or neutralize network incentives. Moreover, since providers are paid in silos, downstream providers have the opportunity to "backfill" any services initially reduced by the innovation, thus driving overall costs even higher. To circumvent these issues providers have had to either "pace" the roll-out of an innovation until reimbursement become more favorable (e.g., ICU moving from a per-diem to a capitation payment or redefining the product and the corresponding reimbursement), establish own health plans (e.g., CareMore) or seek out capitation arrangements. Insurance companies should learn from this. They are in the position to reward innovations and to give an advantage to the innovators by selective contracting with them based on higher value care.
2. Provider culture: Organizations that find themselves in network arrangements often feel like they are competing for the same patients, while in the case of service line innovations, there are internal organizational conflicts around limited resources. Providers are also often resistant to change, especially if it requires the re-design of existing process flows. Thus, the more successful innovations are often embedded within the existing processes, rather than redefining them. This can be changed by leaders who convince their organizations of the importance of healthcare improvement, who understand the redesign of processes, and are able to manage internal budgets in order to accommodate and encourage these new policies.

3. Government regulations: U.S. federal and state regulations not only dictate the scope of practice for healthcare providers, but also the settings in which they could be reimbursed, which significantly hinders the opportunities to use lower cost, yet more adequate personnel within a given model of care. Moreover, legislative action that aims to promote more integrated care is often in conflict with existing anti-trust regulations.

Table 1.1 below, demonstrates which enablers were present at each organization.

Table 1.1 Summary Table for Enablers

Innovation/ Organization	Shared vision	Provider leadership	Front-line empowerment	Defined pop.	Patient-centeredness	Co-creation with customer	Information technology	Culture of learning	Willing payer	Business case
Camden	x	x	x	x	x		x	x		x
CareMore	x	x	x	x	x		x	x	x	x
Hospital at Home	x	x	x	x	x		x	x	x	x
iCare	x	x	x	x	x		x	x		x
ICC	x	x	x	x	x	x	x	x		x
ICSI	x	x	x	x	x	x		x	x	x
Rocky Mountain Health Plans	x	x		x	x		x	x	x	x
VM Marketplace collaboratives	x	x		x	x	x	x	x	x	x
Physician Group Practice Demonstration	x	x	x	x	x	x	x	x	x	x
Sandlot Solutions	x	x	x			x	x		x	x

Survey Response Summary

Question 1: "Please rate the importance of the following "enablers" in the success of your healthcare delivery innovation.

Figure 1.5 Average score for enablers

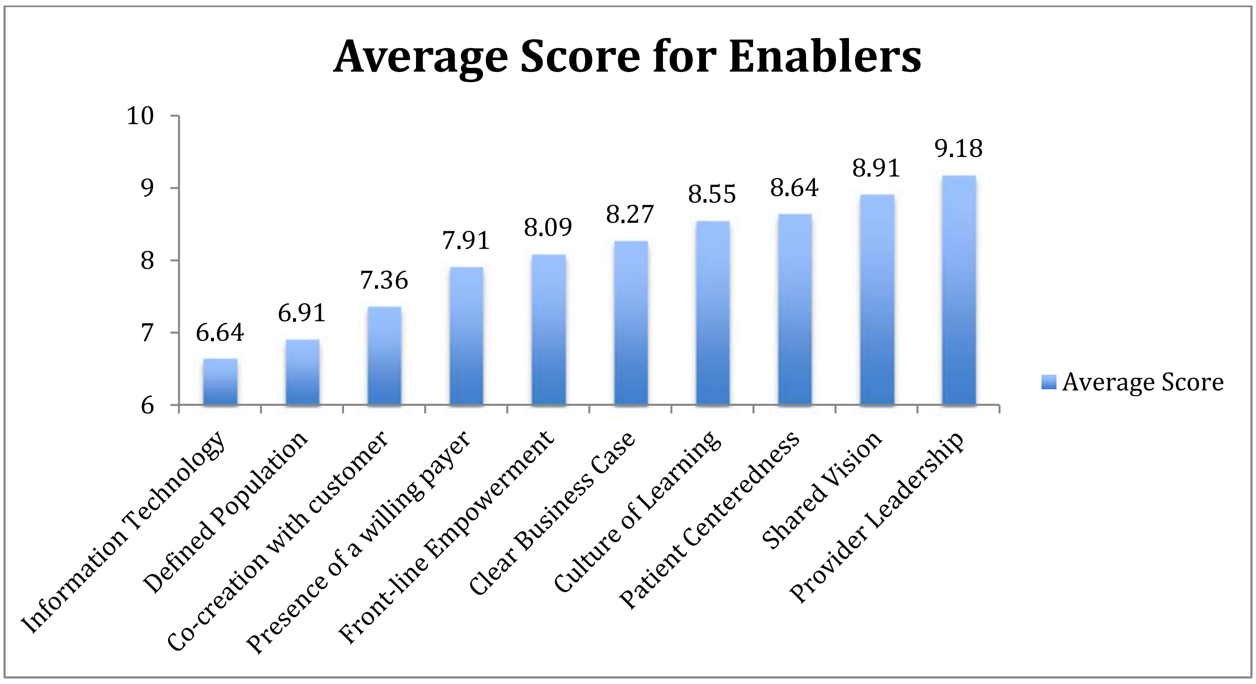


Table 1.2: Average Score for Enablers

Enabler	Average Score
Provider Leadership	9.18
Shared Vision	8.91
Patient Centeredness	8.64
Culture of Learning	8.55
Clear Business Case	8.27
Front-Line Empowerment	8.09
Presence of a Willing Payer	7.91
Co-creation with Customer	7.36
Defined Population	6.91
Information Technology	6.64

Figure 1.6 # of responses with a score of 9-10 for each enabler

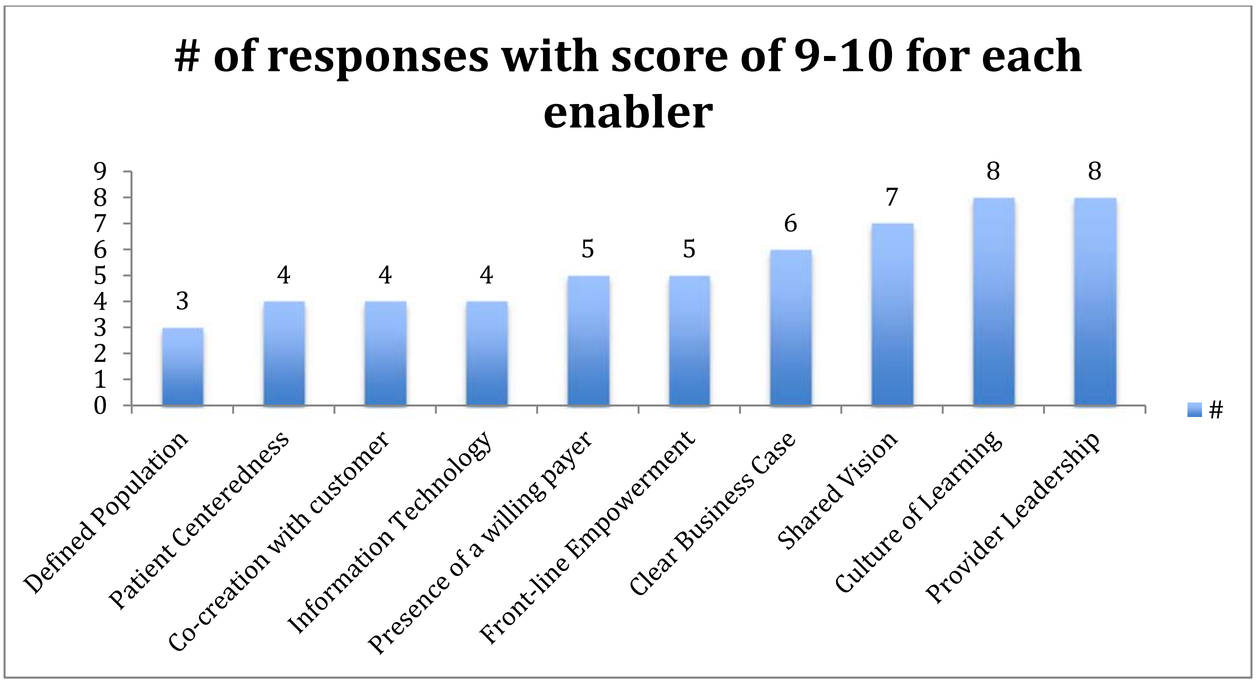


Table 1.3 # of responses with a score of 9-10 for each enabler

Enabler	#
Provider Leadership	8
Culture of Learning	8
Shared Vision	7
Clear Business Case	6
Front-line Empowerment	5
Presence of a willing payer	5
Information Technology	4
Co-creation with customer	4
Patient Centeredness	4
Defined Population	3

Question 2: Please rate the following on the level of difficulty they presented to the implementation of your innovation:

Figure 1.7 Average Score for Difficulty of Barrier to Overcome

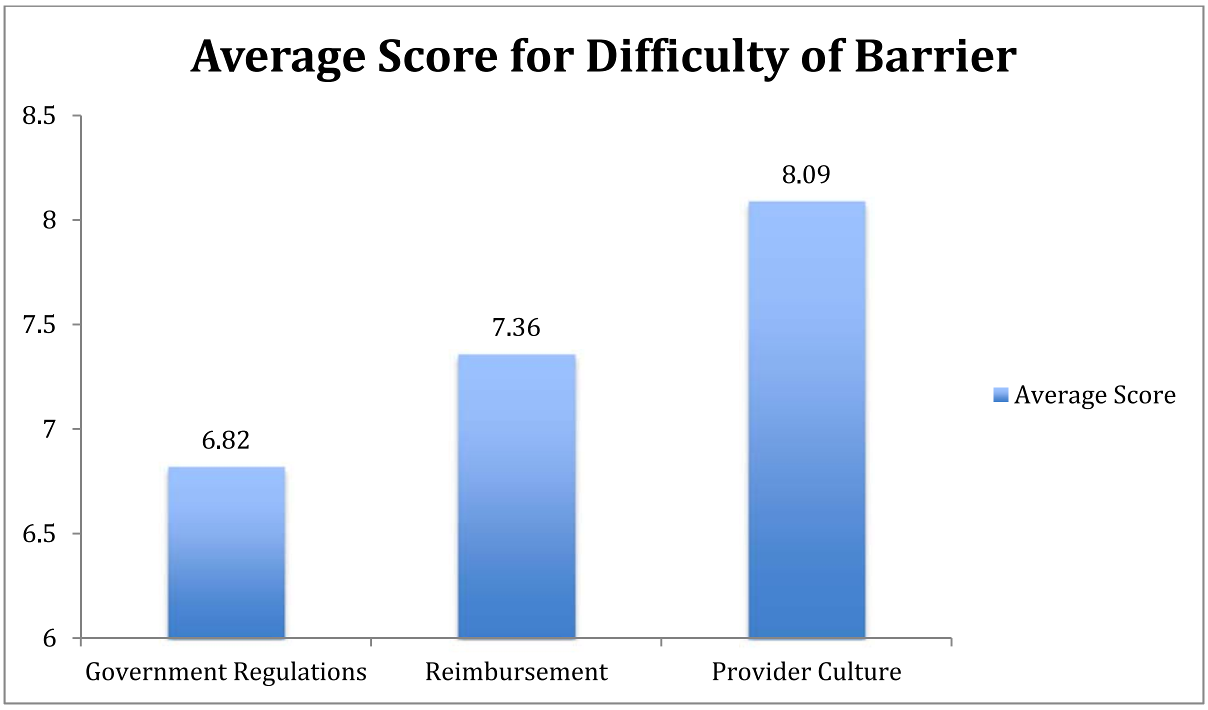


Table 1.4: Average Score for Difficulty of Barrier to Overcome

Barrier	Average Score
Provider Culture	8.09
Reimbursement	7.36
Government Regulations	6.82

Figure 1.8 # of Responses with a Score of 9-10 for each Barrier

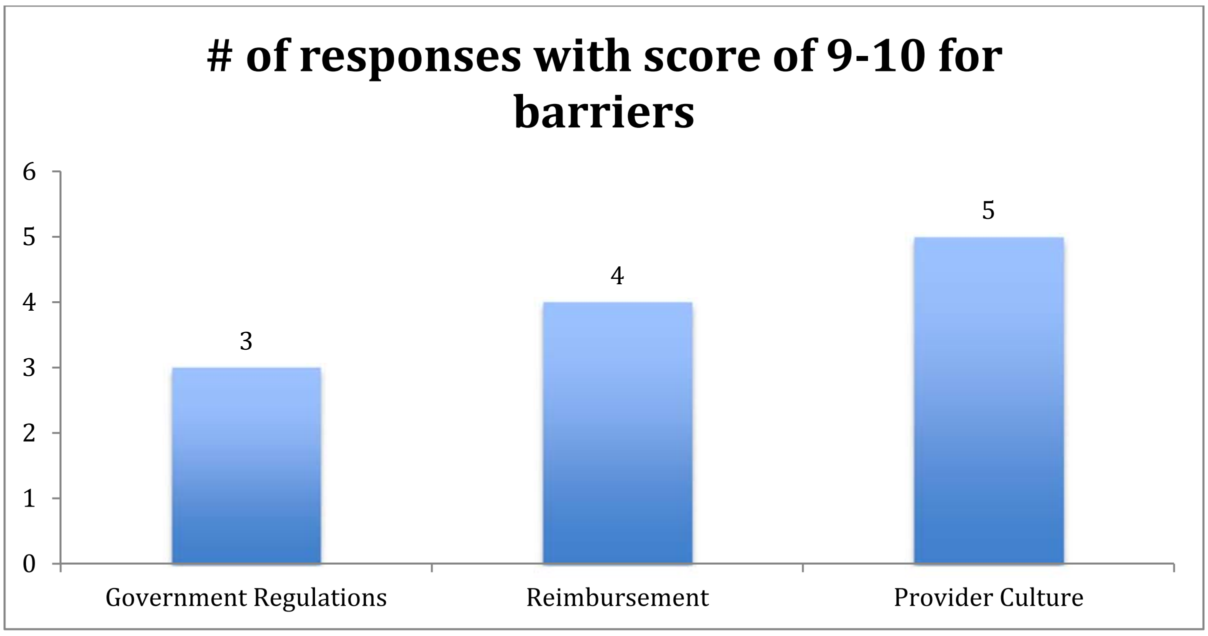
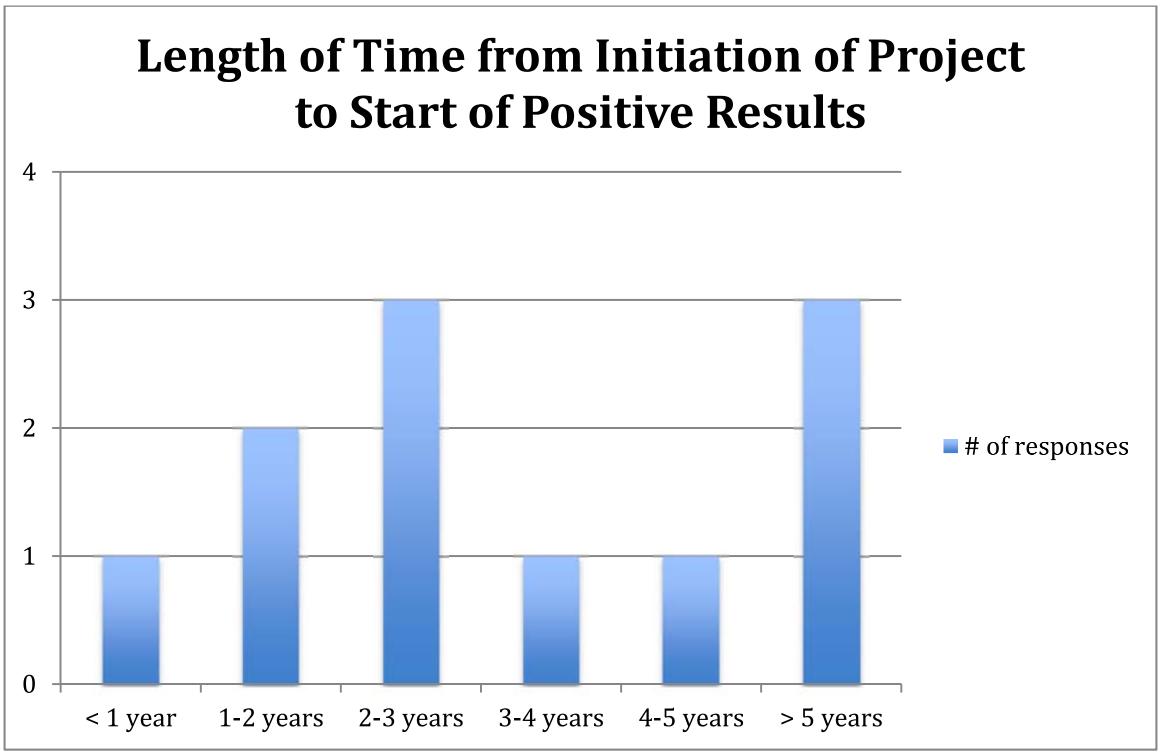


Table 1.5 # of Responses with a Score of 9-10 for each Barrier

Barrier	**#**
Provider Culture	5
Reimbursement	4
Government Regulations	3

Question 3: How long did it take to make the innovation a reality (i.e. from initial conversations about the innovation until you began to see results)?

Figure 1.9 Length of Time from Onset to Start of Positive Results



Discussion

Although the healthcare industry is notorious for market inefficiencies and system waste, our analysis shows that innovation and high value healthcare are not only feasible but also achievable. Moreover, a number of innovations in the United States (e.g., ICC, CareMore) have been in place for 20+ years having found ways to successfully address existing system barriers. These innovations were implemented across a variety of delivery models throughout the United States, yet they each utilized common elements to achieve success. For organizations achieving substandard outcomes and unnecessarily relinquishing excessive vital resources to take care of each patient, that does not have to be the status quo. An understanding of factors that lead to innovative success and progression would help escalate the performance of those organizations not achieving high-value care and reduce the variability the United States is currently obtaining.

Provider leadership was acknowledged as the most important enabler for organizations to successfully fulfill their missions. Although this may have been swayed by the fact that leadership teams within each organization completed survey responses, it is not surprising that was the top result. Without leadership to derive the idea, set a vision/strategy, and execute the plan, then none of the innovations would likely have been successful. In the healthcare setting, providers remain on the front lines seeing patients and dealing with the problems of the current system. Their input, leadership, and garnered respect are vital to implementing solutions that persist over time. Our analysis did not delve into the types of leadership (i.e. servant leader, dictator, hands on, delegator, etc.) found to be most successful, although this would potentially be a useful area of research in regards to this specific idea.

Perhaps the biggest surprise in our results was that presence of a willing payer was not reported at a higher level of importance as an enabler. Many organizations reported that payment/reimbursement was either an area of concern that prompted their initial quest to find a better solution or that obtaining payments for their innovation was a difficulty. This suggests that while having a willing payer is important, as long as other factors (i.e. shared vision, provider leadership, patient-centeredness) are present, that innovative solutions can be successfully implemented.

In regards to barriers to overcome, provider culture emerged as the most difficult, followed by reimbursement. Most providers in healthcare spent many years in school and on the job learning a specific method of performing their tasks in a way that is suppose to produce optimal care for their patients. When asking a group of healthcare providers to alter the way they practice their trade, one would expect pushback. They want to know why they are being asked to change to a foreign convention of doing their job that feels unnatural or safe. Even more complex is the fact that different sectors within healthcare have different cultures (i.e. surgeons are going to have a different mindset than most pediatricians). It takes a strong leader who is capable of effectively melding existing culture to align with the new mission. Many groups overcame this challenge by including several of the providers in the planning and execution of the project.

The last question on our survey sought to determine if a certain period of time was necessary to achieve positive results. The responses did not show any type of trend, which suggests that there is no defined period of time that is required to start seeing positive results. This can possibly be explained by the fact that we selected projects across a broad range of topics and size. Those organizations tackling larger projects would likely need more time for dissemination of their project and to see the positive results.

Comparing our results to related publications, we notice similarities and differences. First, other publications did not rank the level of importance of their enablers or barriers. Second, our rankings allowed us to see that organizational/top level (i.e. provider leadership, shared vision) attributes are the most crucial to obtaining success, while operational attributes (i.e. information technology, presence of an acting and willing payer) are secondarily as important. Thus, organizations looking to improve their delivery of care would primarily need to concentrate on their executive level to set the vision, mission, and strategy while then focusing on the implementation. [8, 56, 57]

For example, The Institute of Medicine published a discussion paper in 2012, “A CEO Checklist for High-Value Health Care”, in which they selected 10 different items that were essential to achieve high-value healthcare. Many of our enabling attributes overlap with their 10 items. We believe that each item is important to health care delivery; however, our results suggest that the emphasis should be placed on what they called Governance priority (visible and determined leadership by CEO and Board) and a Culture of continuous improvement (commitment to ongoing, real-time learning), which are their "Foundational Elements." Our study's top three enabling attributes (provider leadership, shared vision, and patient-centeredness) can all be encompassed in governance priority and our fourth attribute is a culture of learning. Thus, we are encouraged that our study does not disagree with other bodies of work in this area, yet provide further clarity in regards to priority.[57]

Future Direction

While our team aimed to analyze a broad scope of healthcare organizations in the United States, our limited manpower allowed us to only investigate 10 different organizations. Moving forward a group could expand on this number, as there are many more successful healthcare innovations in the country that could be incorporated into this study. To help eliminate any possible bias in the results, questionnaires could be sent to team members throughout the program, rather than just the leadership teams. Additionally, a group could investigate organizations that attempted to use an innovative idea to solve a problem, but failed in their attempt. This would potentially introduce a whole new list of factors that we did not derive in our research.

Ultimately our goal was to find and disseminate the factors that are necessary to not only have, but also to avoid, in an attempt to provide high-value care. We believe we achieved this goal, however, the next step would be dissemination of this information. Specifically, we would like to deliver this information into the hands of the legislative body introducing healthcare laws, healthcare providers and executives, and even health professional students about to enter the field. Having this information in the back of their minds would hopefully encourage them that there are successful innovations in the field and that with the proper execution they too can improve their delivery of care.

Conclusions

The healthcare "system" in the United States is not universally producing the outcomes that warrants the financial investment being made. If nothing is changed, the country faces an inevitable financial collapse secondary to healthcare costs. However, there are organizations throughout the country that have utilized innovative solutions to deliver higher value care by lowering costs while simultaneously improving outcomes. These organizations overcame a broad range of issues that many other healthcare organizations are facing every day in their practice.

Our analysis of selected organizations suggest that there are 10 different factors that are helpful in achieving successful implementation of innovative solutions to a problem, as well as 3 different factors that are most important to overcome in order to be successful. Within each of these factors are varying levels of importance that should be considered when approaching a novel project within one's organization. The most important enablers to incorporate are provider leadership and a shared vision, while the most important barrier to overcome is provider culture. There is no distinct period of time that one should expect to begin seeing positive results.

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Appendix

Exhibit 1: Pre-defined case template

1) ***Case Title***
2) *Contact person at the organization being analyzed: Full Name and e-mail/ phone/ address*
3) ***Author(s)***
    a) ***Full Name(s)**, **Titles** (of theme owners and, if applicable*
        (a) "with" Interviewer/Author/Editor/Project Manager.)
4) ***Extract***
    a) *Fifty to 100 word summary on the title page of the case, which highlights the organisation, role of the key players involved in a particular innovation, and the solution and strategy they proposed, which led to a breakthrough for a given challenge. Highlight role of the vision, mission, concept, strategy, plan and execution, organizational enablers in achieving this innovation and breakthrough, and any general lessons from this case?*
5) ***Introduction***
    a) *Background: short overview of the relevant historical context, in international politics or business, where the key individuals or groups of organisations were confronted with a problem or challenge, which led to their ideas to address it.*
        i) *Introduction of the main parties involved the policy and decision makers; the individual innovators or groups and, if applicable, their roles in their respective organisations, and the specific challenge that they were confronted with.*
        ii) *With the context of the background set – describe how the first ideas emerged this can also be a part of an iterative process.*

6) Innovation and Breakthrough Process

Innovation can be of two kinds: those innovations that stand alone, or those innovations that succeed because they are part of a breakthrough process. Quite often there is an iterative process. Please explain that process touching on the centre of gravity of the innovation or breakthrough and in particular on the elements vision, concept, strategy, planning and/or execution. Try also to approach this from the perspective of the people involved. If applicable describe or try to specify to what degree innovation was the follow-up of invention.

a) Vision: what were the general ideas and vision? Vision introduces the general aims. It is no more or less than a structured form of ideas.

b) Mission: Current purpose and role of the organization in the community and in support of vision.

c) Concept: the concept is the first stage of translation of a vision towards realisation – and can include both substance and process. Among others, it is an integrated overview of specific aims, connecting these to sub aims which become the targets for professional strategy and planning development.

i) Process: was the process, by which the elements occurred formal or informal, improvised or iterative? Does the concept describe a process? (e.g. studies or formal debates).

ii) The concept also can envisage new organisational structures.

d) Strategy is the means to attain the elements of the concept. In other words, it indicates in general terms the choice of capabilities, powers, resources and guiding principles that are deployed to the task envisaged.

i) If aims and means overlap (e.g. the concept has more on process than substance). The parts on concept and strategy can be taken together.

ii) Preliminary Evaluation (Optional): evaluation of the idea of the concept and strategy as such, before discussing execution and results. (For example: describe the innovative character of the concept and strategy). Was this process iterative?

e) Plan and Execution: how were concept and strategy worked out in a plan? How were they executed? What were the actual measures taken to attain the aims of the concept?

i) Did the concept and strategy lead to significant changes in the structure or policy of the organisation?

f) Organizational enablers: Existing governance structures and operational processes, as well as any changes made in support of effective strategy execution

g) External barriers/ constraints: What were they and how were overcome to ensure effective strategy execution

7) ***Results***

   a) *Results: what was the innovation and/or breakthrough? Was the outcome a success, failure or combination of both?*

      i) *Describe the success or failure in achieving a innovation and/or breakthrough.*

      ii) *Did external factors help or obstruct the innovation and/or breakthrough?*

      iii) *Describe the long term consequences of this particular innovation and/or breakthrough (e.g. especially in cases of short-term success and long-term failure etc).*

Exhibit 2: Interview Guide

Healthcare Innovation Interview Template

Hello Mr./Mrs. XXX,

My name is Colt Cowdell and I am a medical student from the Arizona State University (ASU) Healthcare Delivery and Policy Program. I would like to thank you for taking time out of your schedule to be a part of this interview.

As you may be aware already, I am working with a team at ASU to profile healthcare organizations throughout the country that have utilized innovative solutions to deliver high-value healthcare. Our goal is three-fold: 1) to identify specific factors that were instrumental in each organization's success; 2) to compare these factors across a number of successful healthcare organizations and identify common elements; 3) use the insights from (1) and (2) to offer a potential set of solutions that may be used to direct the efforts of other healthcare organizations working toward increasing the value of healthcare they deliver.

I have prepared a list of questions that I would like to go over with you and plan on the interview lasting about 30-45 minutes. Before we begin, do you have any questions for me?

Questions

Introduction

- As it relates to this project please tell me about your history with this organization. How long have you worked t/here? What have been your roles with this organization?

Vision

- What was the primary issue you were trying to address? How did you define success? What were the main drivers of the innovation?

Concept & Strategy

- What were the first steps to transform the idea from vision to a reality? What were some of the early strategic decisions that had to be made?

Execution & Planning

- Can you walk me through the sequence of events/ decisions to get the program to its current state? What things worked well and what were the things that did not work?

Leadership

- Who were the key participants (people/organizations)? What role did leadership play? What did it take to get everyone on board? What leadership style was utilized?

Organization

- How is your organization structured?
- How would you describe the culture of your organization?

Business Model

- Can you describe your current business model? How has it changed overtime? How long did it take for this model to become sustainable?

Technology

- What was the role (if any) of information technology (IT) in the success of this innovation?
- What IT system do you currently use?
    - (If commercially available) How did you choose this particular product?
    - (If build own system) Why did you decide to build your own system? What needs weren't being met by existing products?

Enablers/Barriers

- Are there other key factors that were necessary for your success?
- How would you rank these factors in terms of importance?
- What were the external barriers/constraints that had to be overcome?
- How would you rank these barriers in terms of most difficult to overcome?

- Do you believe this model could be scaled up to a larger level? Which components would be easily reproduced and which would be challenging?
- Did government regulation have any role in the decisions that your organization made?
- What role should government play in order to help others have the success that your organization has had?

Future/Conclusion

- How do you see your company moving forward over the next 5-10 years?

I would like to thank you again for taking time out of your schedule to help me with this project.

Feel free to contact me at 480-275-1930 or ccowdell@arizona.edu if you have any questions or would like to share additional insights. Thank you!