

Healthcare Driven Innovation

An assessment of opportunities in Central Indiana

2013

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Healthcare Driven Innovation: An assessment of opportunities in Central Indiana

Introduction

As part of its mission to serve as a catalyst for the continued growth of Indiana's life sciences industry, BioCrossroads has actively charted the definition and development of new life sciences commercial opportunities over the past decade. Acting as a facilitator and investor, BioCrossroads has supported the commercialization of technologies sourced from Indiana's research universities and through the license or spin-out of assets from corporate stakeholders. Today, we turn our attention to our states' network of sophisticated healthcare providers as an engine for driving innovative products and companies in their own right as well as through strategic relationships with Indiana's medical technology companies. Seeking innovation opportunities in the clinical setting presents a new path for BioCrossroads. But it is one we believe to be necessary in the current environment marked by increasing quality and cost accountability, heightened scrutiny on physician-industry relationships and new physician-hospital relationships that make hospitals even more crucial to the innovation ecosystem.

Through this initial assessment, BioCrossroads is seeking to provide perspective on the major Central Indiana healthcare systems, summarize the major factors that are influencing care delivery and innovation today and begin to identify opportunities for Indiana-based hospital systems to identify and leverage innovative technology developed by their clinicians to improve the quality and efficiency of care leading to better patient outcomes and cost savings. Healthcare driven innovation (HDI) models have been proven elsewhere and have focused on technology innovation and process improvements aimed towards clinical quality and efficiency goals.

Through research conducted to define this HDI program, BioCrossroads has studied national models to determine if a set of best practices and goals can be developed to tailor a strategy unique to the strengths found in various Indiana hospital systems and within the broader Indiana life sciences landscape. These models, illustrated by the Cleveland Clinic example highlighted later in this assessment, have developed over decades, are imbedded in the institutions' culture and have benefited from significant investment in human and physical capital. One question that this assessment seeks to answer is whether these classic models of innovation are replicable in the current environment as healthcare delivery and reimbursement models evolve or whether alternative approaches to innovation could yield more effective results. After studying national models, BioCrossroads then surveyed the local landscape for examples of healthcare driven innovation in practice and engaged the leadership of Central Indiana's major hospital systems to gauge interest in participating in an organized (proprietary to each hospital where appropriate) initiative. The overarching goal of this effort is to assess opportunities that employ the power of innovation developed and supported in the clinical setting by and in collaboration with healthcare clinicians, of which there are more than 20,000 in Central Indiana's major health systems today.

BioCrossroads would like to thank Central Indiana’s health systems for their engagement and discussions with our project team as we conducted this analysis. Their participation has enabled us to prioritize themes on which to focus future collaborative efforts and provided critical perspective to define the opportunities presented in this study. We thank all who participated in this process and specifically would like to acknowledge Central Indiana’s health system Chief Executive Officers who provided valuable input and guidance during this process: Robert J. Brody, Franciscan St. Francis Health; Vincent Caponi, St. Vincent Health; Daniel Evans, IU Health; Matthew Gutwein, Wishard-Eskenazi Health and Bryan Mills, Community Health Network. We would also like to thank Samuel Odle, who has served as BioCrossroads’ primary healthcare consultant on this project and has played a significant role in shaping the areas of focus for future collaboration.

Central Indiana’s Healthcare Provider Landscape

Overview of Hospital Systems in Central Indiana

For purposes of this study, BioCrossroads has focused on the major hospital systems in Central Indiana: Community Health Network, Indiana University Health, St. Vincent Health and Franciscan St. Francis Health. These top four systems account for approximately 80% of the market’s inpatient discharges.¹ A fifth system, Wishard-Eskenazi Health, is also profiled in this report and will begin to play an expanded role on the local landscape through a recently announced partnership with Community Health Network. For this analysis, the Central Indiana healthcare market is defined as a ten county region including Marion, Hendricks, Hancock, Boone, Hamilton, Howard, Tipton, Morgan, Johnson and Shelby Counties. This region varies slightly from the Indianapolis MSA which includes Putnam and Brown but does not include Howard and Tipton Counties. For the purposes of this study, it was determined that capturing the major regional health systems’ assets in Howard and Tipton Counties provided a more comprehensive representation of their regional presence. By doing so, St. Joseph Hospital (St. Vincent Health) in Kokomo and Indiana University Health Tipton have been included in these data. Additionally, with Community Health Network’s July 2012 acquisition of Howard Regional Health System, the decision to include Howard County is further supported. As none of the major regional health systems currently have inpatient hospital facilities in Brown or Putnam Counties. This region has a total population of 1,842,543 in 736,081 households with an average household income of \$68,998.

	Central Indiana Healthcare Market Regional Demographics		
	2011	2016 (projected)	% Change
Total Population	1,842,543	1,939,917	5.30%
Population <18 years	482,084	508,597	5.50%
Population 65+ years	210,354	249,955	18.80%
Households	762,081	763,499	5.25%
Average Household Income	\$68,998	\$70,885	1.60%
Source: Thomson Reuters			

According to the Center for Studying Health System Change, the strength of Indiana’s healthcare and life-sciences industries have helped the region enjoy above-average population growth and lower than average unemployment and uninsurance rates in recent years. These factors have led to continued expansion of the region’s hospital systems which have been “engaging in a battle of bricks and mortar in suburban areas as they compete for well-insured patients.”ⁱⁱ

In addition to expanding the physical reach of their respective hospitals, Central Indiana’s health systems have been driving towards market consolidation. Through alignment, integration and practice acquisition, the market’s supply of independent physicians is nearly depleted.ⁱⁱⁱ This is a trend that is being observed across the country as systems move towards accountable care models. The increasing employment of physicians directly by health systems is one of the major factors that is creating the need for hospitals to play a more direct role in innovation and leading to an integrated model in support of innovation. Historically, quality and efficiency improvements have been driven by technological and process innovations that have occurred with direct clinician engagement, but without the direct involvement of the health system. As health systems are increasingly employing physicians and becoming an even more critical part of the innovation value chain, they will need to define strategies to support the role of physicians as innovators in these new relationships. Historical health system supported innovation initiatives, such as the one resident at the Cleveland Clinic, have dedicated distinct resources to identifying and supporting clinician innovation activities. Providing comprehensive support throughout the development and commercialization process in that mold is likely not the only way to drive a successful innovation program, but each system defining an innovation strategy must also identify an appropriate set of assets available to support, incent and encourage clinicians to successfully participate. A brief introductory overview of each of the major systems is included below to set the stage for assessing current and future opportunities for healthcare driven innovation engagement.

Community Health Network

Community Health Network is a non-profit health system based in Indianapolis that operates six acute-care hospitals throughout the Central Indiana region and has entered a clinical collaboration agreement with Johnson Memorial Hospital. With 18.4% of the overall regional market share based on 2010 data, and nearly 1,100 staffed beds as of July 2012, Community Health Network ranks third in terms of capacity and is tied for second (with St. Vincent Health) in terms of market share.

Community Health Network has made major investments in recent years to achieve compliance with healthcare reform and leverage technology requirements contained within that legislation to improve efficiency and patient outcomes. In April 2012, Community Health Network announced a \$120 million investment to implement the Epic electronic health record system across its system. The system, operational since November 2012, is currently working to unify patient records and enable communications among physician offices and hospitals across the system. The system will also make more information available to patients and create an easier platform on which to access online scheduling and a new physician messaging tool.

In addition to technology investment, Community Health Network has been actively pursuing strategic partnerships to align itself with the accountable care objectives called for in the healthcare reform

legislation. As an early adopter of the Accountable Care Organization (ACO) model, Community Health Network implemented a physician integration strategy prior to healthcare reform's passage and had a head start on a strategy that has now been adopted more broadly. Community Health Network is also looking towards strategic partnerships to scale capabilities without increased capital investment as a means to achieve accountable care. Through partnerships such as the Accountable Care Consortium (ACC) formed with St. Vincent Health and Suburban Health Organization, Community Health Network is seeking to leverage relationships to provide greater efficiencies and a higher level of care than a single system on its own otherwise could. Through joint venture resulting in a partnership among 32 hospitals and over 1,700 employed physicians, the consortium is seeking to reduce costs for their collective patient populations and become financially accountable for their care. Relationships like this allow for the development of best practices to be shared across systems and this partnership specifically focused on the collection of clinical data and sharing of information among the members to drive improved results.

In addition to providing care through its non-profit health system, Community Health Network also operates a for-profit subsidiary, Visionary Enterprises, Inc (VEI), which provides healthcare management and consulting services to new ventures affiliated with the system's hospitals and physicians. Formed in 1987 to provide physician practice management services, VEI has since expanded its focus to include specialty physician, private practice physician and hospital-employed physician practice management services, retail pharmacy operations management, and ambulatory surgery center ownership and management throughout Indiana. Through these more recent joint venturing efforts, VEI has created a mechanism to incent, align and engage physicians with a focus on creating value for the entire Community Health Network system. In November 2012, Community announced the launch of an innovation initiative to encourage clinicians within its organization "to turn ideas within its organization into commercial products, services and companies."^{iv} The initiative, LaunchPad, is focused on connecting internal innovations with outside resources such as academic institutions and industry. In contrast to some innovation focused healthcare initiatives, Community is not organizing a separate fund to invest in hospital-derived technologies, but is utilizing the existing Community Health Network Foundation's Hicks Fund for Innovation and relying on external partners to provide the capital and expertise supporting commercialization. One such partner could be the MD Anderson Cancer Center with whom Community recently announced a new relationship. Ultimately, the program's goal is to produce innovation that can lead to care transformation and cost savings. As it continues to augment its focus on innovation, Community Health Network's VEI subsidiary is well positioned to develop and execute a strategy that supports and incents clinician participation as well as develops strategic relationships with necessary external partners.

Community has been involved with and supported the commercialization of local technologies that their clinicians have identified as valuable. By engaging in early pilot testing with Diagnotes, Inc., a health information technology company whose mobile clinical communications system delivers critical patient information and facilitates secure communication, Community physicians had early access to a technology that has now been adopted by one of their specialty practice groups. This early access provided clinicians the ability to offer feedback to the company aimed at increasing functionality tailored to their practice and be able to enhance the value derived from the technology that they have

now contracted to use. This is just one example of how Community's cultural support of innovation has positively impacted the development of a product that is now supporting the delivery of more efficient and effective care.

Indiana University Health

Indiana University Health (IU Health) is the largest system in the Central Indiana market and accounts for approximately 30% of all inpatient admissions^v. Based in Indianapolis, the state's only academic healthcare system provides services throughout Indiana. Through a partnership with Indiana University School of Medicine, the second largest medical school in the U.S., IU Health aims to achieve its mission of improving the health of its patients through innovation, education and research. IU Health is comprised of 19 hospitals with over 3,500 physicians providing care to patients.

IU Health's network is made up of its flagship academic health center campus, several hospitals statewide of which it is the sole corporate member, and a series of partnerships and affiliations with other hospitals throughout the state. For the purposes of this report, we have focused on the academic health center made up of four Central Indiana hospitals: IUH Methodist Hospital, IUH University Hospital, Riley Hospital for Children at IUH and the recently opened IUH Saxony and the four suburban facilities in the Central Indiana region: IU Health North Hospital, IU Health West Hospital, IU Health Morgan Hospital and IU Health Tipton Hospital. In total, the IU Health Central Indiana Region facilities operate approximately 1,910 beds.

In 2011, IU Health (formerly Clarian Health) underwent a significant rebranding effort. This effort, which aligned the system directly with the Indiana University School of Medicine along with significant acquisition and alignment activity with hospitals and physician groups, positioned IU Health as Indiana's largest statewide healthcare system. As IU Health continues to grow and expand its reach across the state, unique opportunities for innovation focused activities, including unique capabilities to participate in clinical research, will be available to the system.

IU Health has publicly made innovation a high priority through its rebranding and also through its increasing focus on clinical trial activity and direct investment in innovation through its venture capital arm, CHV Capital, Inc. CHV Capital is a return driven investor that is guided by the strategic objectives of IU Health. The fund's focus is on building value in business opportunities that serve a business or clinical need in the market, but also play a key role in strategically advancing IU Health's "long-term strategy to be the preeminent provider not only in Indianapolis, but also on a national scale by emulating and someday competing with players such as Mayo Clinic and Cleveland Clinic."^{vi}

CHV Capital carries out this mission through investing in innovative services and therapies that align with IU Health's key clinical objectives, such as neuroscience. An example is the investment in MindFrame, an early stage medical device company recently acquired by Covidien which was invested in by CHV Capital and advised by the Indiana Clinical and Translational Sciences Institute.

These activities will provide a financial return and also position IU Health to be an early adopter of innovative technology in a core area of expertise allowing the system to deliver improved outcomes, outpace its competition and maintain its status as a world class neuroscience center.

IU Health promotes its history of innovative treatment programs and capabilities to differentiate itself in the market. In addition to neuroscience, through the largest adult neuro-critical care unit in the country, those programs include:

- Indiana's only National Cancer Institute-designated patient care center;
- First private hospital in the world to perform a heart transplant;
- One of the busiest pediatric surgical centers in the country, performing more than 13,000 procedures per year;
- 200 cancer researchers leading 300 adult and pediatric clinical trials;
- Indiana's only nationally ranked pediatric heart program at Riley Hospital for Children at IU Health;
- Nationally recognized cancer subspecialty programs in breast, lung, pancreas and testis;
- Access to IU Health Proton Therapy Center;
- Nation's only 24/7 real-time continuous brainwave monitoring model at IU Health Methodist Hospital; and
- Nationally ranked urology program and home to the International Kidney Stone Institute.

IU Health, through its affiliation with the medical school, has certain critical infrastructure in place that positions them to leverage clinicians' roles in innovation through an integrated structure. The IU School of Medicine's technology transfer infrastructure and IP and conflict of interest policies will likely play an important role in supporting physician innovation directly, or serve as a model that may be tailored specifically to the care delivery environment. Whether it is through the existing infrastructure or a newly defined set of guidelines, physicians employed by and affiliated with IU Health will likely have more clearly defined rules of engagement surrounding intellectual property and conflict of interest. These rules of engagement are crucial to defining opportunity for new relationships among physicians, health systems and external parties around innovation.

Franciscan St. Francis Health

Franciscan St. Francis Health, a non-profit health system that is part of the Franciscan Alliance based in Mishawaka, Indiana, is the fourth-largest system in the Indianapolis market. The Franciscan Alliance operates 13 hospitals across Indiana and the Chicago area. In the Central Indiana market, Franciscan St. Francis Health hospitals, located in Indianapolis, and Mooresville, have more than 500 beds in operation giving the system a strong presence in the southern portion of the market. Through a recent opening of a specialty surgery hospital in Carmel, St. Francis has begun to expand into the northern portion of the market as well. In 2010, St. Francis accounted for 11.1% of the Central Indiana market share.

In March 2012, St. Francis closed its Beech Grove hospital and consolidated its operations at its Indianapolis facility. This move was part of a \$300 million expansion project that started in 2007 with the addition of a new emergency department, wound care institute, surgical suites and an expanded cancer center. Also in 2012, Franciscan opened a surgical hospital in Carmel which "offers a new approach for patients requiring surgery for orthopedic, urological and other problems. Patients will be able to see their doctors, have lab tests run and undergo imaging with the hospital's CT and MRI scanners all under one roof."^{vii}

Franciscan Alliance has been an early mover working towards achieving better patient outcomes through broad EMR adoption and accountable care. In 2011, they announced a \$100 million investment in the Epic electronic medical system and were also selected to be one of only 32 healthcare organizations to participate in the Pioneer Accountable Care Organization model. Franciscan has recently announced an agreement with American Health Network to form the Franciscan AHN Accountable Care Organization, one of the first programs selected to participate in the CMS administered Medicare Shared Savings Program. The goals of the program, as described by Franciscan AHN, are to achieve better population health, provide higher quality care and reduce costs. Through their early adopter status, Franciscan is well positioned to be an early participant in programs stemming from accountable care's implementation and realize potential benefits (such as shared savings) earlier than other systems. This advantage could enable Franciscan to identify early opportunities for innovation in the new healthcare environment.

St. Vincent Health

St. Vincent Health, an affiliate of St. Louis based Ascension Health, is the second largest health system in Central Indiana. St. Vincent is a non-profit, Catholic health system that currently operates 1,286 beds within the region spread across seven hospitals. Local market hospitals include: St. Vincent Indianapolis, St. Vincent Anderson Regional Health, St. Vincent Carmel Hospital, St. Vincent Heart Center of Indiana and St. Vincent Mercy Hospital in Elwood. In 2010, St. Vincent Health held 18.4% of the regional market share, behind IU Health and tied for second with Community Health Network.

St. Vincent has been active in forging collaborations to expand their reach and differentiate their services. Joint ventures with specialty providers such as the St. Vincent Heart Center of Indiana and the Indiana Orthopaedic Hospital allow the system to promote their differentiated services while partnerships such as the one with Community Health Network and Suburban Health Organization, as described previously, provide purchasing power and help enable accountable care efforts. In an early effort to address the projected physician and nursing shortages that will be exacerbated by the insurance coverage expansion provisions of healthcare reform, St. Vincent has formed collaborations with Marian University's School of Nursing and, along with Community Health Network, was a lead donor to Marian's new College of Osteopathic Medicine.

St. Vincent Health, as part of the broader Ascension Health System, has access to their broader network of resources supporting innovation. Ascension, through its affiliated healthcare venture fund, Ascension Health Ventures (AHV), is an active participant in the healthcare innovation value chain. Representing several of the more than 200 hospitals that are represented by the health system investors in AHV, St. Vincent has unique access to innovative technology solutions that develop and can be deployed across their system. To date, AHV has raised more than \$550 million to invest in and advance medical device, health information technology and healthcare service companies. This strategy has been focused on later-stage companies providing a window into opportunities that could be deployed near-term and impact current healthcare challenges.

Through its affiliation with AHV, St. Vincent's has been able to opportunistically spin out non-core assets into stand-alone companies. For example, what began as St. Vincent's biomedical equipment management program was spun out as TriMedx in 2000 and is today a leading medical equipment

management service provider helping more than 1,000 healthcare providers manage their healthcare technology needs. St. Vincent Health's access to a healthcare-focused venture fund provides a unique ability to advance its key clinical objectives, create additional revenue opportunities and differentiate itself relative to its competition through an innovation platform.

Wishard-Eskenazi Health

Wishard-Eskenazi Health is the non-profit health system that is owned by Marion County Health and Hospital Corporation and serves the primary purpose of providing care to the county's poor and indigent. The system operates one hospital facility, Wishard Memorial, on the Indiana University School of Medicine's campus in downtown Indianapolis, ten community health centers and 21 community mental health center sites and residential facilities. A new hospital is currently under construction with a targeted opening date of December 2013. When the new Eskenazi Hospital opens, the Wishard name will be dropped and the system will operate as Eskenazi Health.

The current Wishard Memorial Hospital has 316 inpatient beds and the Wishard-Eskenazi Health system experiences approximately 15,200 admissions and 990,000 outpatient visits annually. Wishard-Eskenazi is staffed by 4,124 full-time employee equivalents of which, 1,100 are physicians. The new Eskenazi Hospital will include 327 inpatient beds, 17 operating rooms, 4 interventional labs, 12 labor and delivery rooms, a 90-bed treatment room emergency department with a 20-bed clinical decision unit, more than 200 exam rooms, one of two adult Level I Trauma Centers in Indiana and the region's only adult burn center.

Wishard-Eskenazi's roles in innovation through the use of health information technology, in partnership with the Regenstrief Institute have been recognized by regional and national organizations, including the Office of the National Coordinator for Health Information Technology and the National Association of Public Hospitals and Health Systems. Wishard also played a key role (along with Indiana University School of Medicine and the Regenstrief Institute) in developing and implementing a nationally recognized evidenced-based model of geriatric care. The Geriatric Resources for Assessment and Care of Elders (GRACE) model focuses on many issues faced by older adults -- depression, mobility, transportation, nutrition, medications, access to needed services and other health issues related to aging and implements a team approach to care coordination. Clinical trial results suggest that GRACE improves health and quality of life, decreases emergency department visits and lowers hospital admission rates in lower income older adults at high risk for hospital admission. This model has been endorsed by the Centers for Medicare and Medicaid (CMS) and has been adopted by several other health organizations and is a prime example of a low technology, hands on process innovation focused on delivering higher quality care at lower costs.

Wishard-Eskenazi has also recently announced an innovative collaboration with Community Health Network which has the potential to transform the delivery of care for the high need population that it serves and expand the reach of one of the nation's largest public safety net health systems. The joint operating partnership that was recently announced has drawn significant attention as a potential model for public hospitals around the country. The move will expand the scope and scale of the system and allow it to better handle the projected increased patients as healthcare reform is implemented. This development, along with Wishard-Eskenazi's relationship with the Indiana University School of Medicine

whose physicians provide comprehensive inpatient and outpatient services, creates an interesting platform to explore innovation in technology, processes and delivery models and should be monitored closely as it unfolds.

Central Indiana Health System Innovation Assets

	Community Health Network	IU Health	Franciscan Alliance	St. Vincent Health	Wishard-Eskenzi Health
ACO Participation	✓	✓	✓	✓	✓
Innovation Strategy	✓	✓			
EMR Adoption	✓	✓	✓	✓	✓
Dedicated Fund	✓	✓		✓	
Academic Collaborations	✓	✓		✓	✓

Central Indiana Market Snapshot

Central Indiana Regional Overview Year Ended 2010

Hospital	Location	Average Daily		Discharges**	Market Share
		Beds*	Census*		
Community Hospitals (East, North and South)	Indianapolis	750	460	31,669	17.0%
Indiana Heart Hospital	Indianapolis	56	35	2,528	1.4%
Community Health Network Subtotal		806	495	34,197	18.4%
Indiana University Health Academic Medical Center	Indianapolis	1,506	969	34,806	18.6%
Indiana University Health North	Carmel	161	97	7,104	3.8%
Indiana University Health West	Avon	142	82	7,015	3.8%
Indiana University Health Morgan	Martinsville	76	25	1,667	0.9%
Indiana University Health Tipton	Tipton	25	19	1,107	0.6%
Indiana University Health Central Indiana Region Subtotal		1,910	1,192	51,699	27.7%
Franciscan (Indianapolis, Beech Grove)	Indianapolis	400	200	18,531	9.9%
Franciscan Mooresville	Mooresville	77	31	2,333	1.2%
Franciscan Alliance Subtotal		477	231	20,864	11.1%
St. Vincent (Indianapolis, Carmel and Peyton Manning Children's Hospital)	Indianapolis	857	559	28,396	13.9%
Heart Center of Indiana	Indianapolis	107	57	2,429	1.3%
St. Joseph Hospital	Kokomo	137	77	4,060	2.2%
St. Vincent Stress Center***	Indianapolis	-	-	1,873	1.0%
St. Vincent Subtotal		1,101	693	36,758	18.4%
Patients from Central Indiana Region receiving care from independent Central Indiana Regional Hospitals		1,195	661	45,491	23.2%
Patients from Central Indiana Region receiving care from hospitals outside the Central Indiana Region		-	-	2,350	1.2%
Total Market Volume		-	-	191,359	100.0%

* Source: Fiscal year 2010 Medicare cost reports

** Source: Indiana Hospital Association, 2010

*** Source: Beds, Average Daily Census, and Percentage Occupied for the St. Vincent Stress Center are included in the St. Vincent totals

**** Independent Central Indiana Region hospitals include: Hancock Memorial, Hendricks Regional Health, Howard Regional Health, Indiana Orthopaedic Hospital, Johnson Memorial, Major Hospital, Riverview, Westview, Wishard, and Witham. Howard Regional Health and Westview are now part of Community Health Network. The VA Hospital is not required to file Medicare cost reports, and is not included.

Role of Healthcare Delivery in Innovation

Healthcare systems and hospitals play a unique role in both the creation and adoption of innovative technology and processes. The advancement of the medical technology industry's product portfolios have been largely driven through clinician engagement with industry at the bedside. The clinical application of these technological advancements (and the data that it generates) is paramount to their success and, without the unique perspective of innovative clinicians developed within care settings, new product development would likely stall.

Innovation in the medical device industry has been fostered through relationships with clinicians, particularly surgeons. Opportunities for product improvement are often identified by the clinicians using them in their daily practice to treat patients. Historically, surgeons and the medical device industry have established working relationships to advance therapies and develop new product ideas. With these relationships undergoing intense scrutiny over the past several years, governmental agencies and professional organizations alike have been limiting the interaction between physicians and industry. While the intent of such policies is well intended and focused on limiting improprieties and conflicts of interest, the impact is viewed by many to be much broader and potentially damaging to the ability to effectively innovate. Much attention will undoubtedly be paid to the nature of these relationships and the impact of the restrictions on the collaborative relationships between clinicians and industry focused on the creation of innovative therapies and products.

In addition to industry relationships with clinicians to discover and develop new therapies and devices, clinicians also play a critical role in innovation through their participation in clinical trials. Typically sponsored by pharmaceutical and medical device companies, these trials seek to answer important questions surrounding new ways to diagnose and treat disease safely with improved results. Through conversations with health systems across the region, it has become evident that clinician participation in clinical trials is being strongly encouraged. As a means to identify more effective ways to treat disease and create a supportive culture oriented towards innovation, clinical trial participation provides increasing opportunities for clinicians to participate in innovation. Clinical trial participation can also provide financial incentives for the participating institutions and clinicians and can be a means to differentiate a hospital or health system when recruiting top clinical talent.

Clinicians have historically had influence over which technologies have been adopted by hospitals and health systems. Those clinicians have had broad discretion over the specific devices that were used in their operating rooms. Due to the increased scrutiny on surgeon–industry relationships, the increasing direct employment of surgeons by hospitals and the increased focus on cost and quality, surgeon influence has decreased, although they remain key factors in the adoption of innovation.

The Changing Healthcare Landscape

The re-election of President Obama in November 2012 has resolved much of the uncertainty surrounding the Patient Protection and Affordable Care Act (ACA). Debate about the ACA has largely

shifted from *if* it will be implemented to *when* the various components will be implemented. Health systems, payers, providers and states are all working to gauge the potential impact of these policies. Physicians and health systems, if they were not already, are rapidly preparing for the implementation of ACOs, a major component of the legislation that creates a new environment in which innovation will be developed and deployed. Although some ACOs, including those participating in the Medicare Shared Savings Program, still operate in a fee for service mode, ACOs are moving towards a model in which a health system or provider network is paid for the treatment of a complete episode of care over a defined time period.

Cost and quality of care, as well as overall effectiveness of services, have emerged as the driving economic forces in the post healthcare reform era as health delivery adapts to the ACO model. While ACOs are now a reality, the concept is being implemented differently among hospital systems. Even in the Central Indiana market, different structures and strategies are emerging. For example, IU Health's size and geographic reach has led to an integrated IU Health ACO while a regional system such as Community Health Network has taken steps to align with a complementary system like St. Vincent Health, which is part of a larger national health network with a significant presence within Indiana.

The 2012 launch of the Medicare Shared Savings Program has participating ACOs seeking innovative and efficient ways to control costs and improve the quality of care by meeting established quality measures thereby allowing them to share in incentive payments to be offered through the program. Of the systems profiled above, Franciscan Health and IU Health have been approved to participate in the plan. With the recent announcement of the Accountable Care Consortium led by St. Vincent and Community, these health systems have created networks that may be viewed by employers and payers more favorably than other ACO models.

Medicare Shared Savings ACOs have entered into contracts with CMS in which they take responsibility for the quality of care Medicare patients receive. In return, those ACOs have an opportunity to share in any savings realized through improved care. To be able to realize those savings, the ACOs must meet 33 quality measures established by CMS for 2012. These measures are intended to ensure that the savings in healthcare expenditures are achieved through the right care that is delivered safely and in a timely manner. While there is still debate surrounding the impact these measures will have in overall patient care, incentives of hospitals and physicians are now aligned towards successfully meeting them in order to share in any savings generated. Topics covered by the measures include: care coordination; patient safety; preventive health services; care for at-risk populations; and patient and provider reporting.

Although not all ACOs will participate in the shared savings program, they will all likely increase their focus on innovation in search of technology and process solutions that support meeting the defined quality measures thereby becoming eligible to realize savings. Through programs such as Community's LaunchPad, health systems can institute a culture supportive of their clinicians' active participation in the discovery and development of innovative solutions to real-time problems. Even for systems not seeking shared savings, quality measures like the ones described above can provide a productive framework for focusing innovation efforts and potentially creating incentive opportunities for participation.

Quality and efficiency of care have historically been improved through technological and process innovations that, for the large part, have occurred with direct clinician engagement with industry. While the hospitals and health systems have played an active role in the vetting and adoption of technologies, they traditionally have not played a primary role in the innovation of new products. Through the ACO model which is more closely aligning physicians and health systems, often through employment agreements, opportunities to align incentives to innovate are also being identified. Though the large capital investment to create institutional models to develop and commercialize innovation in the mold of the Cleveland Clinic, Kaiser Permanente or the Mayo Clinic may not be permitted in this rapidly changing healthcare environment, the cultural aspects that drive those systems' clinicians to be oriented towards innovation are becoming more necessary for systems to succeed in an era of accountable care. To achieve those goals, health systems are more frequently starting to house clinical translational science initiatives and perform technology transfer and development services akin to those in research university settings. Through this assessment, BioCrossroads has seen these models start to develop in the regional market. As they become operational, they will seek to define best practices and collaborative opportunities that allow each system to link with resources available on the landscape that could help them succeed.

Drivers Impacting Healthcare Innovation	
Accountable Care	Technology Adoption
Physician Employment	Hospital Procurement
Conflict of Interest	Health Economics
IP Policies	Industry and Academic Collaborations

Models of Healthcare Driven Innovation

Cleveland Clinic Innovations: An Instructive Model

Several examples of healthcare driven innovation models were studied during this assessment, all with unique attributes, but Cleveland Clinic Innovations (CCI) stands out as the model upon which most others are often compared. Imbedded as a core component of the Clinic's culture since its establishment in 1921, its innovation program provides a valuable case study to organizations seeking to focus their own innovation efforts. However, it is one that would be difficult to replicate without significant investment in both human and physical capital.

Developed as a comprehensive innovation engine, CCI is responsible for commercializing all inventions and related capabilities developed throughout the Clinic. Its approach to innovation is one of a "one-stop-shop" covering everything from translational research cores and animal facilities to seed funding,

prototyping, clinical trial coordination and company launch. Currently employing a team of 65 professionals, CCI serves as an effective intermediary bringing commercialization expertise to a healthcare delivery setting.

Much has been written about the Clinic as a model for innovation and, in its mature state, it more closely resembles a venture capital backed accelerator model like the Foundry or the Innovation Factory than a traditional technology transfer program. The expertise provided by the internal validation capabilities supported by their professional team and the financial resources that can be deployed to propel promising technologies through product development prior to seeking external funding or partnering relationships provides value to their clinicians, but is not replicable for the majority of health systems. This is due to the tremendous cost of building such an enterprise – a fact that the Clinic itself has recognized and has since designed an alliance strategy around.

Major factors contributing to Cleveland Clinic Innovations' ability to identify, extract and commercialize new technologies are:

- Clinicians are encouraged and compensated for innovative intellectual contributions;
- There is a transparent commercialization process;
- Fair licensing and compensation processes have been developed;
- Strong relationships with funders and expert advisors have been developed;
- Physicians as salaried employees are more closely aligned with the hospital system;
- A market oriented approach to product/IP development has been instituted;
- Incubator and accelerator capabilities with expert advisors, executives in residence and pre-clinical and prototyping capabilities are available;
- An experienced and incented team of 65 employees has been built to aid in validating technology and decreasing investment risk;
- Relationships and affiliations with medical schools have been developed; and
- Seed capital and grant funding is readily available.

Realizing that there is a significant amount of innovation occurring within the walls of other hospitals that do not enjoy the decades of investment and advancement enjoyed by a system like the Clinic, Cleveland Clinic Innovations has launched a Healthcare Innovation Alliance program seeking to provide their unique capabilities to clinicians working with other health systems. Alliances have been developed with four systems thus far: MedStar Health in Washington, DC; North Shore Long Island Jewish Medical Center in New York, NY; ProMedica in Toledo, OH and St. Joseph Health in Orange County, CA. Although not a healthcare delivery institution, the Cleveland Clinic has also entered into a Healthcare Innovation Alliance with the University of Notre Dame. It will be instructive to track how these relationships evolve as new technologies are developed.

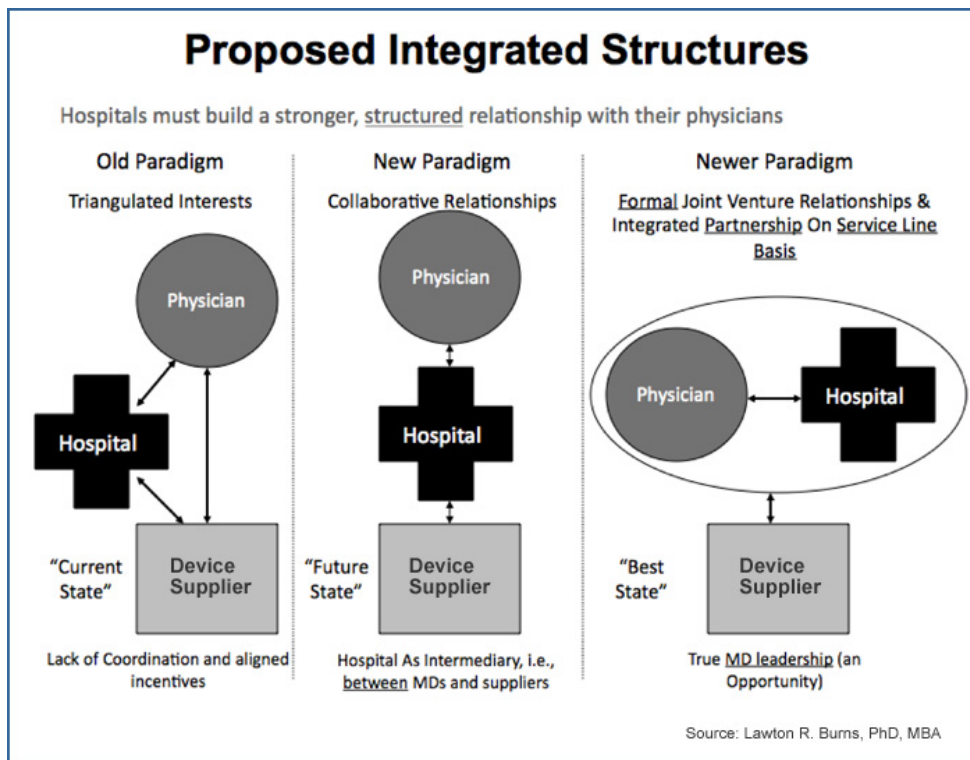
In the current healthcare environment, innovation will be required to achieve the goals mandated by the new environment marked by the Affordable Care Act. While pressures created in this environment mandate that resources be more strategically deployed and that classic innovation models such as the one resident at the Cleveland Clinic are too capital intensive to replicate, new relationships must be sought out to support and incent clinician innovation throughout the healthcare delivery ecosystem.

The Healthcare Innovation Alliance program is one that may prove successful, but many other opportunities exist to partner with external resources to extract the innovation potential of our clinicians, who are closest to the patients and processes demanding more effective and efficient solutions. In Indiana, our concentration of medical technology companies focused on orthopedic, cardiovascular and many other interventional therapies provides a unique opportunity to explore relationships supporting innovation.

Evolving Engagement with Industry

Increasing scrutiny on the relationships between physicians and the life sciences industry continues and the Physician Payment Sunshine Act's implementation date is upon us. Physicians are increasingly being employed by hospitals and health systems putting increased demands on their time while raising new questions about the handling of IP developed through their clinical practices. Those involved with innovation of products requiring clinical guidance to aid in the safe and successful design and development of the next generation of medical technology have been rethinking the dynamic of how these relationships can work in the future. Lawton Burns, a professor at the University of Pennsylvania, has studied these topics extensively and his findings have recently been published in the second edition of his book, The Business of Healthcare Innovation.

Among the topics covered in Burns' work is an analysis of the changing relationships between device makers, physicians and hospitals and how these changes will impact the development of medical technology. As discussed previously, as health systems adopt accountable care models and shift away from fee for service toward bundled payment, decision making authority for adopting new technology, purchasing specific devices and engaging with industry is increasingly controlled or influenced by the hospital and related health system. These relationships are influenced by physician employment and alignment, as well as by increasing government regulation of the financial relationships between industry and physicians. The likely result of all of this, as Burns puts it, is surgeons will have weaker ties with manufacturers and less time to be involved in new product development and traditional partnerships will be disrupted.^{viii} All of this suggests an increasing role of the hospital and health system in the overall scheme of medical technology innovation and will demand new structures which can truly align incentives of hospitals and physicians through structured relationships (see graphic below). The details of these relationships, including creating a culture that supports and directly incentivizes participation in innovation, will determine how (and with whom) industry will develop strategic relationships to stem the disruption of their ability to develop new products.



As evolving engagement structures and strategies are developed, innovation itself is being viewed differently by the medical technology industry and the payers that reimburse the care provided using their devices. In this new era focused on cost, quality, efficiency and outcomes, innovation efforts have shifted from creating the new device that differentiates itself slightly from its competition and is supported by a new branding and marketing strategy to one focused on innovation that promises to deliver the same or better outcomes at lower overall cost. Focus on health economics and outcomes is intensifying and, as reported at the Cleveland Clinic’s 2012 Innovation Summit, medical device companies like Stryker have health economists deployed on all of their product development and innovation teams who are tasked with thinking about who is going to pay for them.^{ix} This new industry approach to innovation provides new opportunities for hospitals and health systems to leverage their clinical knowledge to start to determine the total cost associated with certain procedures, identify opportunities to deliver care more efficiently and drive future innovation in that direction.

An instructive example of an approach attempting to solve problems surrounding cost and quality can be seen in the efforts of Warsaw-based OrthoWorx’s work to develop the Orthopedic Capital Clinic, a collaborative specialty surgery clinic focused on research, education and innovation surrounding orthopedics. This entity’s vision is focused on measuring cost and outcomes and developing innovative solutions to delivering care more efficiently and effectively through the institutional knowledge of clinicians combined with health economics and outcomes research – not just on the next new device.

The Orthopedic Capital Clinic: A New Orientation Towards Innovation

The vision for the Orthopedic Capital Clinic (the OCC) is to develop a specialty orthopedic clinic dedicated to advancing orthopedic care through clinical excellence, research, education and innovation. It is envisioned that top-tier surgeons who are informed by (and engaged in) clinical research focused on

all aspects of care – from pre-, peri- and post-operative patient care will drive the mission of the OCC and operate under a framework specifically designed to measure outcomes and costs. Data collected at the OCC will be shared and used to develop best practices for improved and reproducible clinical outcomes. By focusing on research and education, the OCC will not only be a destination for worldwide orthopedic leaders to learn and collaborate, but it will be a facility that promotes hands-on education for industry and healthcare professionals.

The OCC's vision is focused on providing high quality specialty orthopedic care in an environment designed to collect economic outcomes-based clinical data to inform the delivery of care through clinical research, education and innovation. Designed to address the pressures to reduce cost, improve quality and assume accountability for patient care, the OCC's model is seeking to inform more efficient and effective treatment pathways that can control costs and maintain high-quality clinical outcomes.

The OCC is also being designed to serve as an incubator for local partnerships between industry and universities. While the industry cluster in Warsaw has active relationships and engagements with universities, educators and researchers around the world, having a local clinical connection point focused on developing relationships among the Indiana-based orthopedic industry, university and healthcare delivery institutions could greatly increase the pace of innovation in the state, influence the future of an innovative industry and leverage a key asset. In order to maintain transparency and credibility of data as well as manage conflicts of interest, industry's primary engagement will be through arms-length contracting for clinical research studies. While new product innovation from the largest industry players may not be the primary goal of the OCC, orthopedic entrepreneurial activity in the region will gain a critical clinical access point that could accelerate new product innovation and grow new companies on the local landscape. Together, the OCC and the vast orthopedic domain expertise resident in the region could provide a unique opportunity to drive product and process innovation oriented to the evolving healthcare landscape. This project could serve as a model for other industry sectors and healthcare institutions focusing on innovation of processes and products that are focused on increased quality at reduced cost – the major factors driving all aspects of healthcare today.

Opportunities for Collaboration

Central Indiana's health systems are marked by a successful track record of identifying pre-competitive opportunities for collaboration that benefits patient care. Through initiatives such as the Indiana Health Information Exchange (IHIE), the nation's leading health information exchange that was organized around the region's major health systems and the world-class assets resident at the Regenstrief Institute to solve a common challenge of collecting and communicating patient information and the similarly collaborative Indianapolis Coalition for Patient Safety (ICPS), Central Indiana's healthcare community has proven its ability to work together towards the common goal of delivering the best possible care to patients. The area of innovation is one that is largely proprietary and not commonly shared among health systems. Viewed through a different lens in the current environment focused on cost and quality, there may be new opportunities to work together to identify common challenges and vet potential solutions. Illustrative examples are included below with regard to patient safety and quality, behavioral and mental health and a conceptual center for innovation. These examples could be used to drive discussions among systems to determine whether collaborative relationships surrounding

innovation could prove beneficial to each system's efforts while maintaining a firewall around their proprietary innovation efforts.

Patient Safety and Quality

A collaborative approach to impacting healthcare through innovation could be developed in coordination with the Indianapolis Coalition for Patient Safety (ICPS). The ICPS has established a forum for hospitals in the Central Indiana region to share best practices and focus on solving issues impacting patient safety. Comprised of senior executive, medical, nursing and other officers from all of the regional health systems, the ICPS is leveraging the regional healthcare resources to improve patient safety through collaboration.

Focused on a common vision, the ICPS has worked to improve outcomes by sharing resources, developing common performance targets, establishing accountability measures, leveraging assets, and educating the community on their findings. Through these collaborative efforts, the ICPS has developed targeted areas of focus, including: safety leadership and culture; medication safety; surgical safety; hospital readmission prevention; blood safety and patient education.

With the broader healthcare community working collaboratively to set standards of best practices and share lessons learned, valuable insight into opportunity for healthcare innovation could be developed. While the ICPS is not specifically focused on innovation, as problems are identified in their targeted areas, individual ICPS members could focus internal innovation efforts on developing new processes or products offering innovative solutions. As solutions to these products are developed, the ICPS membership's deployment of these technologies could support their core mission of improving patient safety while playing an important role in a broader innovation strategy. Through this patient-focused collaborative platform, issues of cost and quality could also be studied.

Behavior and Mental Health

In discussions with Central Indiana's health system leadership, behavioral and mental health emerged as an area with potential for collaborative interest. Accounting for a significant amount of total healthcare spending, roughly 5.6% in 2011, questions have arisen regarding the need for new models of care to improve patient access and outcomes. Largely due to a lack of funding and reimbursement for mental health facilities and services, health systems do not compete for this underserved patient population, yet the lack of care ultimately does have negative impacts on each of them. Based on preliminary findings, there is interest in continuing discussions to explore an opportunity for collaboration around a multi-disciplinary model of coordinated behavioral and mental healthcare.

Center for Innovation

Indiana's history of life sciences and medical technology entrepreneurship, marked by Eli Lilly and Company, the Cook Group and the orthopedic industry in Warsaw and the overall concentration of life sciences companies in the state has created fertile ground for the support and development of new drugs, devices, diagnostics and other therapies. BioCrossroads' efforts in organizing a funding environment supportive of companies developing these new technologies, whether it be through direct investment by the Indiana Seed Fund or from one of the venture capital firms invested in by the Indiana Future Fund and INext Fund, has aided the development of promising technologies on the local

landscape. Additional support structures could be built to assist connecting entrepreneurs to hospital business development and procurement groups, connecting to industry through a coordinated clinical trial infrastructure and increased expertise in the business of healthcare.

Innovation Roundtable

Early-stage companies face many challenges surrounding regulatory and reimbursement, but even when these challenges are overcome, navigating hospital procurement processes has proven very difficult. Understanding how new technologies are analyzed, purchased and deployed within the region's healthcare systems could prove invaluable for these companies with products and services approved for marketing. By supporting a local testing ground for innovation, opportunities to pilot products and have an early opportunity to invest in the most promising innovations of strategic significance to their operations, Indiana's healthcare community could play a key role in driving the adoption of new products and platforms that deliver higher quality care at lower costs.

Exploratory conversations have been conducted with local-market health systems willing to dedicate time to determine how to establish transparency to the process and organize an internal team all of whom play a role in the procurement process. This first step will be taken to determine if there is an opportunity to establish parameters within which local life sciences companies can work to showcase their new technologies to the region's health systems and potentially gain early-access to assess opportunities to solve clinical problems with innovative solutions. By leveraging existing sector-specific assets, such as IHIE with respect to health information technology, these solutions could be better positioned to meet current needs and after a level of validation could be well positioned to pilot their technologies with participating hospitals.

Clinical Trial Collaboration

In addition to facilitating a supportive environment for entrepreneurs to introduce their technologies to health systems, coordinating health system efforts around clinical trial participation could increase access to technologies developed by companies within Indiana as well as outside of the state while generating additional economic activity. To increase attractiveness to sponsors of clinical research, Indiana's hospitals and health systems should explore the development of a common platform of engagement. Through the formation of a common Institutional Review Board (IRB), multi-site studies within Indiana could be conducted through a transparent framework with pre-negotiated terms. Critical to the development of such a framework are:

- Common contracts;
- Common costs;
- Consistent compliance policies and procedures;
- "One stop shop" to access key hospital resources; and
- Study management services.

Early interest has been expressed by several Central Indiana health systems in exploring an efficient and transparent platform for clinical trial participation.

Healthcare Business Intelligence

Core to the concept of a healthcare focused center for innovation is the need for a deep understanding of the business of healthcare. Being able to react to and address real time healthcare industry problems is critical to the success of a potential collaboration of this type. Meetings or symposiums targeting current challenges to the business of healthcare from the perspectives of key administrators, nurses, physicians and other clinicians could provide substantive guidance on how best to prioritize healthcare innovation efforts to achieve tangible results. Collaborative participation among the Central Indiana regional health systems could add to the depth of knowledge within each institution and enhance the region's ability to focus innovation efforts on real time healthcare challenges and highlight the region as a center of healthcare delivery excellence.

Conclusion

At the outset of this assessment, BioCrossroads sought to understand whether an integrated innovation enterprise in the model of Cleveland Clinic Innovations could support innovation developing in the major health systems on the local landscape. Through this process, we have determined that while such models can offer the cultural, financial and development support required to commercialize clinician derived innovations, this model would be difficult to economically replicate in the current healthcare environment. In this era marked by increased importance of cost of care and quality of outcomes, new opportunities are emerging to define innovation-focused strategies driven by clinician and health system engagement.

Care delivery is not only a source and proving ground for innovation; it is also an important economic driver. Identifying ways to engage and support the broader healthcare delivery assets of the state could provide an increased link and a newly defined role for care delivery networks to work with the life sciences industries. Through this assessment, BioCrossroads has begun to explore opportunities for broader engagement between the traditional life sciences sector and healthcare through innovation. Within the evolving healthcare landscape, it is envisioned that this is the first of such exercises.

In the current environment of accountable care, clinician and health system incentives are increasingly aligned which provides a unique opportunity to affect change in support of innovation. Whether it be through incentives to participate in clinical trials or the creation of a platform to share ideas and connect to external resources, the current environment, which incents the entire healthcare delivery system to achieve defined measures, can be the impetus needed to drive innovation in the clinical setting towards the common goals of physicians and health systems mandated by accountable care. Though this assessment does not recommend establishing a healthcare-focused integrated innovation enterprise coordinating the development of new technologies in Central Indiana, it has served as a valuable exercise to gain insight on the current alignment of incentives within healthcare delivery and provides perspective as systems define innovation strategies oriented towards delivering care more effectively in the current environment.

Each of Central Indiana's health systems is engaged in defining and implementing proprietary approaches to innovation appropriate to their specific missions. As evidenced by many of the examples above, including the Accountable Care Consortium, the Indiana Health Information Exchange and the

Indianapolis Coalition for Patient Safety, the region's health systems are willing and able to work collaboratively towards common goals, but product and process innovation agendas specific to each system and their clinicians continue to be largely retained within each respective system. BioCrossroads sees opportunities to engage with each system independently to continue the development of technology commercialization infrastructures and serve as a connecting point for external commercialization resources, but it is our opinion that few opportunities for inter-hospital system collaboration around innovation in this sense will prove feasible. The competitive nature of technology development and specific process improvements providing differentiated results will prohibit the internal innovation teams from sharing common resources and approaching solutions to problems together. With that being said, it is with regard to the definition of problems in search of innovative solutions and potentially, an organized effort towards increased engagement with the medical technology industry through innovation, where collaboration among health systems holds the most promise.

Through this initial assessment, BioCrossroads has found that significant opportunity for the commercialization of healthcare derived innovation for the benefit of the cost, efficiency and quality of patient care is present throughout Central Indiana's healthcare community. Though competitive forces inhibit the ability to forge a collaborative framework for a broad based innovation platform serving the needs of the healthcare community as a whole, many potential pre-competitive opportunities for collaboration have been identified. It is through these pre-competitive opportunities that problems in need of innovative solutions can be identified. Through facilitated forums focused on pre-competitive issues such as patient safety, general parameters for standard protocol could be developed and shared with the healthcare community at large. The implementation and augmentation of those protocols through the utilization of novel processes or technologies would reside in each system individually. The issues and ideas discussed through this collaborative framework could be one of several factors that each system's internal innovation efforts could consider as they prioritize technology development and commercialization projects as well as process improvements.

Furthermore, the participation in clinical research with Indiana's medical technology industry holds great promise for Indiana's healthcare delivery community to participate in the innovation process. A formalized approach to industry leading to a platform designed to engage clinicians across health systems in clinical trial participation and the development of a communications tool to match industry study needs with Indiana healthcare systems and clinicians, as well as their patient populations, could lead to a statewide clinical trial resource network creating value for both industry and the delivery systems alike. To attract greater industry interest in sponsoring clinical studies at Indiana institutions, a common and transparent set of rules governing clinical trials at participating institutions should be developed. Through the exploration of a common statewide Institutional Review Board ("IRB"), Indiana's healthcare and life sciences stakeholders could create an opportunity to increase the state's participation in clinical research, ultimately resulting in increased economic activity and improved patient health. It is through these new relationships between health systems and industry partners that medical technology innovations could be enabled and, while largely not a collaborative process among systems, a collaborative platform could provide opportunity upon which direct relationships could be developed.

The medical technology industry’s emerging focus on health economic and outcomes research provides an opportunity to engage the industry in the clinical setting in a new way. With the concentration of industry within the state, there are unique opportunities to engage industry in the clinical setting to establish means of collecting and analyzing these data in support of future innovation. Through efforts such as the proposed Orthopedic Capital Clinic focusing on developing an education and research focused institution to study cost and quality of outcomes relative to orthopedics, or similar efforts that could be explored in other specialties with deep regional industry expertise, new relationships among physicians, hospitals and industry need to develop to solve the challenges being presented relative to cost, quality, efficiency and outcomes. Industry can play a key role in informing innovation strategies of health systems and those systems that can effectively structure relationships with industry partners while aligning the incentives of the hospital, physician and industry will be best positioned to realize results from their innovation efforts.

Responses to Evolving Healthcare Landscape	
Innovation Programs	Academic Collaborations
Outcomes Research	Industry Relationships
Health Economics	Physician Engagement
Center for Innovation	Clinical Trial Collaboration

Central Indiana’s healthcare community has a rich history in working collaboratively to address issues that benefit patients and the community at large. Through efforts such as the Indiana Health Information Exchange, the Accountable Care Consortium, the Indianapolis Coalition for Patient Safety and others, leadership throughout Indiana’s healthcare delivery enterprises have come together to identify and address issues of common concern. It is through a coordinated effort focused on identifying issues in need of innovative solutions to drive internal innovation efforts and the development of a collaborative platform to support the development of relationships between industry and our healthcare delivery systems that BioCrossroads sees the potential to help support a culture of innovation that can inform and advance the collective community as well as each individual health system’s proprietary technology commercialization efforts and Indiana’s highly concentrated medical technology industry. Whether it is in relation to a collaborative enterprise or each system’s internal innovation efforts, health economics and outcomes research is now a crucial component of the overall healthcare innovation ecosystem and is an area of common concern that will impact all healthcare innovation developed and deployed in this era of accountable care. It is through the identification and advancement of these critical capabilities that innovation will continue to occur within each health system and the basis on which to explore the potential for a collaborative enterprise to organize and

advance the systems collective expertise in clinical research to support the development of new technologies in coordination with industry. BioCrossroads will utilize this report to further engage with Central Indiana’s leading health systems individually to explore the framework for such collaboration and define the value proposition for engaging in a coordinated innovation strategy focused on leveraging the state’s vast healthcare delivery assets.

ⁱ *HealthLeaders-InterStudy*, Indianapolis Market Overview, January 2012.

ⁱⁱ *Center for Studying Health System Change Community Report*, Indianapolis, IN, December 2011.

ⁱⁱⁱ *HealthLeaders-InterStudy*, Indianapolis Market Overview, January 2012.

^{iv} Community to commercialize innovations, *Indianapolis Business Journal*, November 5, 2012.

^v *Center for Studying Health System Change Community Report*, Indianapolis, IN, December 2011.

^{vi} *HealthLeaders-InterStudy*, Indianapolis Market Overview, January 2012.

^{vii} Rudavsky, S. (2012, Apr 28). A new name in Carmel. *Indianapolis Star*.

^{viii} Penn Author Outlines Challenges to Medical Device Innovation, *LDI Health Economist*, June 2012.

^{ix} A Different Tune: Redefining Innovation in the Medical Device World, *peHub*, November 6, 2012.

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