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Board Summary Report June 2019

Regenstrief Center for Healthcare Engineering

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Regenstrief Center
for Healthcare Engineering

Board Summary Report
June 2019
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Summary

The Regenstrief Center for Healthcare Engineering (RCHE) strives to conduct nationally recognized research that ultimately leads to improved quality, accessibility, equity, and affordability of healthcare delivery. Our mission is to pursue a proactive, patient-centered, and wellness-focused healthcare delivery system by conducting impactful research that leverages collaborative partnerships. We focus on the generation, diffusion, and adoption of evidence to better inform healthcare policy and practice. Our expertise in systems thinking, lean methodologies, and engineering design places us in a unique position to address Sam Regenstrief’s vision of effective and efficient healthcare delivery.

In this Board Summary Report, we focus on Purdue Healthcare Advisors (PHA); their mission, past success, current activities, and impact. We further describe examples of current areas of activities, including those being piloting in Indiana (i.e., improving long term care and mitigating opioid use disorder). PHA was chosen based on the feedback received from the December 2018 Program Committee meeting.

Details about RCHE over the past six months, including faculty hiring, endowment activities, research activities and accomplishments, and finances may be found in the June 2019 Board Supplemental Report. Going forward, we plan on focusing on one key RCHE activity in the Summary Reports.

Purdue Healthcare Advisors’ Mission and Vision

PHA serves as RCHE’s outreach initiative for the healthcare industry. It was created in 2005 by a partnership among RCHE, the Purdue University Technical Assistance Program, and the Indiana Hospital Association.

Grounded in systems engineering principles, PHA consults, coaches and trains healthcare professionals in all capacities in both hospitals/health systems and physician practices. We've worked with more than 150 hospitals, trained more than 3,000 healthcare and public health workers, partnered on projects with nearly 100 health departments, and assisted more than 3,000 physicians with compliance. We are made up 32 full time employees, with Randy Hountz serving as Director, and broken into three service lines: i) Health IT Security, ii) Process Improvement, and iii) Quality Services. An organizational chart is provided in Appendix A.

History teaches that when you change how money is made, everything changes. Healthcare is in a transitional period as it shifts from making money by delivering service to making money by cost-effectively delivering improved health. Being successful in such an environment requires providers to quickly learn how to deliver evidence-based care in a team setting, target care by predictively managing populations of patients across the continuum, motivate lasting health-behavior change, understand and be transparent about the true cost of care, and achieve operational excellence. Our mission is to work with healthcare organizations to build their capacity for change.
As these changes unfold, we at PHA envision a healthcare system that prospers more from keeping people well and actively managing chronic conditions than by treating disease in high cost venues such as hospitals. We see a care system grounded in science, engineering, and management that is able to deliver value optimized care and predict/avoid disease and the acute flare up of chronic conditions. *We envision a healthcare system that supports people living the healthiest lives possible by emphasizing wellness and providing affordable quality care for all in need.* PHA is guided by two strategies for its mission and vision: i) **Small is Big:** we focus on small and under-resourced providers, and ii) **Applied Research:** we build relationships with researchers to develop innovative services.

In order to support PHA’s mission, several important relationships have been developed. They come in the form of RCHE faculty and students, grant partners, healthcare providers, and state agencies and federal agencies.

**PHA Successes and Current Efforts**

We have had a significant impact on the health and well-being of the Indiana population through our work with a wide variety of healthcare providers. In this Section, we describe two examples of our past successes and three examples of our current efforts. A full list of some of the larger historical and current grants and their impact are provided in Appendix B.

**PHA Past Successes Examples**

**Helped Indiana Providers Achieve Meaningful Use/Interoperability** – The Centers for Medicare & Medicaid Services (CMS) provides incentives to encourage eligible clinicians to use health information technology (IT), most notably certified electronic health record (EHR) technology. This is commonly referred to as a “meaningful use” (MU). Certified EHR technology makes it possible for clinicians to submit information electronically to CMS in a format they can process. A $14M grant awarded by CMS (through the Indiana Family Social Services Administration (FSSA)) allowed PHA to assist with the Medicaid MU Assistance Program. The program helps Indiana ambulatory organizations (i.e., small groups and independent practices) successfully attest to the stages of MU so they can receive CMS incentive payments designed to offset associated health IT costs.

Through 2018, PHA assisted more than 6,000 Indiana providers with MU and, in doing so, **helped bring over $200 million of incentives into Indiana.** We are proud of our role in building the HIT infrastructure in Indiana, especially for the small and underserved providers.

PHA’s assistance involved a combination of remote and on-site services to help providers progress through the Medicare and Medicaid EHR Incentive Program. This program has since evolved in the Indiana Medicaid Promoting Interoperability (PI) Program. Through the PI Program, PHA provides a combination of remote and on-site services to guide up to 175 eligible providers in 2019 to successful compliance.
**Improved Cardiovascular Care through Healthy Hearts in the Heartland (H3)** – H3 was a federally funded research program, led by the Feinberg School of Medicine at Northwestern University, that worked with small practice clinics in the Midwest to implement and evaluate quality improvement strategies for the prevention of strokes and heart attacks. H3 sought to identify the best practices, tools, and supports needed for small clinic settings to improve heart health of their patients. PHA played a key role in H3 by providing participating practices with direct assistance that focused on six targeted specific heart-health measures required by the EvidenceNOW\(^1\) project and aligned with the Million Hearts initiative. PHA also worked with 60 Indiana practices as the practice facilitation component on Million Hearts evidence/quality improvement in primary care practices.

Million Hearts offers an online Hypertension Prevalence Estimator Tool to generate an expected percentage of patients with hypertension based on the specific characteristics of the clinic’s patient population. PHA facilitators helped H3 practices generate their own “hiding in plain sight” searches based on parameters from the Physician Quality Reporting System. They determined who would make the follow-up calls, what the caller would say, what workflow they would use (walk-in nurse visit, scheduled nurse visit, provider visit, etc.), and what workflow would be necessary to get the updated reading to the provider. This helped practices in pulling the reports, reaching out to targeted patients, and coaxing them back in for evaluation. During evaluation it was found that the results also led to several patients in this group being found to have high blood pressure and being sent directly to the emergency room to be treated for a hypertensive emergency.

**PHA Current Efforts Examples**

**Helping Providers Shift to Value-Based Care** - Funded by CMS and managed by the IU School of Medicine, the Great Lakes Practice Transformation Network (GLPTN) is part of a national effort to work alongside healthcare professionals to improve the quality and reliability of care. This higher-quality care is better-coordinated with fewer unnecessary tests and procedures, leading to fewer hassles and lower costs. The overall goals of the GLPTN are to provide better care to patients, at a lower cost, for better health outcomes for 10 million patients across Illinois, Indiana, Kentucky, Michigan and Ohio and to partner with 15,500 providers to transform their practice in preparation for upcoming health care mandates and share their learnings. As a part of the GLPTN, PHA is working with 3,000 providers to help them change from fee-based care (where reimbursements are based on the number of services provided) to value-based care (where reimbursements are based on the overall quality and efficiency of care provided). Value-based care is designed to encourage a “holistic” team approach to care, which requires communication and coordination between health care providers across specialties.

PHA’s lean services team is providing to members two efforts: GLPTN+Lean and GLPTN+LDI, which build capacity for ongoing practice improvement in organizations.

\(^1\) [https://www.ahrq.gov/evidencenow/index.html](https://www.ahrq.gov/evidencenow/index.html)
Implementation of this formal, process improvement methodology focuses on reducing unplanned and unnecessary readmissions; improving the referral process; improving health outcomes through depression screening, diabetes control (A1C), and hypertension control, and reducing unnecessary testing; reduction of unnecessary hospitalizations; and expansion of access.

Reducing ED/Inpatient Utilization for Post-Acute Care Patients – According to a state scorecard released by the Commonwealth Fund and the American Association for Retired Persons2, Indiana ranked worst in the US for long-term services and support. This included worst in affordability and access, choice of setting and provider, and support for family caregivers. Although growth in Medicaid spending has been relatively flat over the past few years, long-term services and support costs are increasing at a much faster rate than other Medicaid components and is putting significant pressure on state Medicaid budgets3.

Funded by CMS through the Indiana FSSA, PHA, with RCHE faculty and students from Purdue’s Colleges of Engineering, Health and Human Sciences, and Pharmacy are working to lessen emergency department (ED) and inpatient utilization for post-acute care patients. We are piloting the effort in two Indiana communities: Evansville and Terre Haute. In Evansville the primary hospital is Deaconess Midtown Hospital and in Terre Haute it is Union Hospital. There are at least three post-acute care facilities associated with each of these hospitals.

Our specific aims for the project are to understand the key reasons for ED and inpatient admissions and readmissions from post-acute care facilities, to design portfolios of interventions and estimate their impact on long term care outcomes, to pilot an integrated systems approach based on lean principles in Evansville and Terre Haute, and facilitate generalizability to other small care neighborhoods in Indiana.

We are applying advanced data analytics that can be put into healthcare provider workflows to improve decision making for better outcomes and more effective resource utilization. Key to the work is developing replicable modules that can be used in other Indiana communities, after accounting for their unique requirements.

Reducing Harms from Opioid Use Disorder - Substance use disorder, particularly opioid use disorder (OUD), is a complex and multifaceted US public health crisis. In Indiana, drug overdose death rates increased by over 22% from 2017 to 20184. Indiana is still above the national average in opioid prescriptions adjusted for population and almost 1 in 20 people report using opioid-containing medication for non-medical purposes5. It is also estimated that the State will lose from $1.25 to $1.8 billion in gross state product each year due to lost productivity from OUD6.

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Funded by CMS through the Indiana FSSA and by the Office of Minority Health, PHA with RCHE faculty and students from Purdue’s Colleges of Engineering, Health and Human Sciences, Pharmacy, and the Purdue Polytechnic is developing a learning-based approach to systematically identify, treat, and ultimately help prevent OUD. This will include the development of a “small care neighborhood” approach (Figure 1) to address OUD that brings together important partners including hospitals, behavioral health facilities, transitional housing authorities, peer coaches, corrections and law enforcement, and first responders.

![Diagram of small care neighborhood](image)

**Figure 1.** Example of a “small care neighborhood” that includes the set of important entities that interact with an individual with OUD.

We are working with two small care neighborhoods: Allen County and Tippecanoe County. The focus in Allen county is to reduce the prevalence of neonatal abstinence syndrome (NAS) in Ft. Wayne and to improve treatment for pregnant women and recent mothers with OUD. Note that it has been estimated from the Ft. Wayne task force (though we have not yet verified) that 18% of children born in Ft. Wayne have been exposed to opioids in the womb. The focus in Tippecanoe county is to identify individuals with OUD early, get them into treatment, and better engage them with their treatment.

An important aspect of this work is meaningful community involvement. We are using the “Strategic Doing” process developed in Purdue’s Agile Strategy Lab, which enables community partners to design and guide collaborative networks that generate innovative solutions and create shared value in a lean, agile, and fast way. A second important aspect of

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7 [https://agilestrategylab.org/solution/strategicdoing/](https://agilestrategylab.org/solution/strategicdoing/)
this work is to use lean as both a change agent and a means to deploy evidence. Finally, our work is being developed in a way that will be easily replicable in other Indiana communities upon completion of our pilot programs.

**PHA Transitions**

Based on a strategic analysis of its activities and resulting outcomes, PHA is currently undergoing several important transitions to increase its impact to a broader population. Four areas of emphasis include:

- Development of an online training platform, PHA Direct,
- A change in approach to lean as our change agent,
- Building cybersecurity expertise with broader industries (e.g., Infosys), and
- A transition to more significant healthcare challenges using the broader Purdue community.

A discussion of each of these transitions are given in Appendix D.

**Conclusions**

In this Board Summary Report, we have shown just a few of the ways that PHA is achieving our mission of working with healthcare organizations to build their capacity for change based on systems engineering principles. We are currently undergoing several important strategic changes to help us be even more effective. This includes a recent focus to take on even more significant challenges in collaboration with RCHE faculty and students with an eye towards generalizability and replicability. We are also excited at the opportunities that combining the diversity of expertise and experience from PHA staff and RCHE affiliated faculty and students on important community-based problems. We look forward to telling the Regenstrief Foundation about our future impact that is derived in part as a result of these transitions.
Appendix A - Organizational Chart
# Appendix B – Past Examples of Contracts

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<th>Funder</th>
<th>Topic</th>
<th>Award Amount</th>
<th>Result</th>
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<tbody>
<tr>
<td>Center for Medicare &amp; Medicaid Services (CMS)</td>
<td>HITECH – This $14M grant was to improve the Meaningful Use of electronic health records (EHR)</td>
<td>$14,000,000</td>
<td>Assisted over 3,000 providers and over 50 hospitals with meeting meaningful use requirements</td>
</tr>
<tr>
<td>Hospital Engagement Network</td>
<td>Supported by the Indiana Hospital Association for lean six sigma training for hospitals</td>
<td>$1,000,000</td>
<td>Trained hundreds of healthcare workers on LSS and coached projects to improve hospital patient harms</td>
</tr>
<tr>
<td>Indiana State Office of Rural Health</td>
<td>Build capacity in critical access and rural hospitals</td>
<td>$1,000,000</td>
<td>Worked with Critical Access/Rural Hospitals, building lean capacity over the past 7 years</td>
</tr>
<tr>
<td>State Medicaid (FSSA)</td>
<td>Meaningful Use</td>
<td>$6,000,000</td>
<td>Continued meaningful use work for Medicaid providers (technical assistance and Health IT security) for over 1,000 providers the past 5 years</td>
</tr>
<tr>
<td>Indiana State Department of Health (ISDH)</td>
<td>Public health</td>
<td>$3,000,000</td>
<td>Worked with ISDH on several projects including public health quality improvement, pandemic planning, departmental process improvement, and tobacco cessation efforts</td>
</tr>
<tr>
<td>Healthy Hearts in the Heartland (H3)</td>
<td>Small practice quality improvement</td>
<td>$1,000,000 (PHA part)</td>
<td>Worked with 60 Indiana practices to implement Million Hearts evidence/quality improvement in primary care practices</td>
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### Appendix C – Current Contract Examples

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<tr>
<th>Funder</th>
<th>Topic</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Center for Medicare &amp; Medicaid Services (CMS)</td>
<td>Great Lakes Practice Transformation Network</td>
<td>Working with 3,000 providers helping them prepare for shift from fee-based care to value-based care</td>
</tr>
<tr>
<td>Medicare Quality Payment Program</td>
<td>Provider TAA</td>
<td>Providing technical assistance to 3,000 providers and helping them understand and submit data yearly as appropriate</td>
</tr>
<tr>
<td>State Medicaid (FSSA)</td>
<td>Meaningful Use</td>
<td>CMS/State project working with Medicaid providers continue to meet meaningful use</td>
</tr>
<tr>
<td>State Medicaid (FSSA)</td>
<td>Opioids</td>
<td>Integration of community collaboration, lean, and faculty; 2 Small care neighborhood pilots work to lessen harm of opioid epidemic</td>
</tr>
<tr>
<td>State Medicaid (FSSA)</td>
<td>Post-Acute Care</td>
<td>Two small care neighborhoods work to lessen ED/inpatient utilization for post-acute care patients; work anchored at hospital and 3 post-acute care facilities each</td>
</tr>
<tr>
<td>Critical Access Hospitals (Various)</td>
<td>Lean</td>
<td>Working this year to certify several critical access hospitals with a lean office – indicating they can provide lean leadership, complete value stream analysis, and deploy rapid improvement events/lean daily improvements; working with 5 new critical access hospitals to help them establish a lean program in their facility</td>
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Appendix D – PHA Transitions

Transition to an Online Training Platform – PHA Direct - PHA is providing a more convenient way for health care professionals to obtain certifications in lean process improvement and develop advanced people skills in team facilitation, change making, leadership, and other areas with the launch of PHA Direct. It is an online platform for instruction, coaching and community building at Purdue University, in an effort to build organization-wide lean capability.

PHA Direct is a response to increasing demand from hospitals and health care organizations for ways to boost quality, drive down costs, and accelerate dissemination of successful improvements. It gives us the capacity to train more people more efficiently, while adhering to our rigorous academic standards.

Offerings include lean health care training, which equips professionals with the knowledge and skills to improve patient flow, reduce hospital-acquired conditions, enhance patient satisfaction, and reduce preventable readmissions, among other goals. The online platform provides students with flexible access to the instruction and tools required to complete assignments accompanied by the coaching they need to succeed in creating real-world process improvement. For example, the Advanced Lean Practitioner coursework includes a flipped classroom approach where students study online to gain basic conceptual knowledge, then experience a multi-day, improvement event firsthand.

In addition to the curriculum, the platform includes membership in Connect, a new community of practice devoted to operational excellence in health care that provides for ongoing professional collaboration and direct access to Purdue experts. PHA Direct also will feature knowledge cards (kCards), a micro-learning approach that supports the mastery of soft skills for achieving lasting behavior change. Participants will access online tools to create and share kCards, as they build resilience and emotional intelligence as well as skill in innovation, leadership, team facilitation and more.

PHA Direct also provides a way for PHA-enrolled clients to build a repository for successful changes made. In particular, it allows clients to build on metrics, changes, workflow processes, countermeasures, and results.

Transition from Lean Six Sigma to Lean First – PHA has been using a lean six sigma (LSS) methodology in hospitals for many years. LSS is a data-driven improvement methodology for improving, optimizing, and stabilizing processes. Mark Clare, PHA Principal Advisor-Strategic Initiatives, noticed that clients were moving through the steps of lean six sigma but not applying the statistics. In fact, hardly anyone was “using the math.” He realized that part of the reason for this is that applying six sigma to health care may not be appropriate because health care processes are just too immature. They have high levels of natural and artificial variation that make them too unstable for many of the techniques of statistical process control. We would need to do a lot of lean work first to stabilize the processes, and that’s where lean without six sigma comes into play. What is needed is a model that emphasizes lean and does a better job of democratizing it across the employee spectrum to give more staff valuable pieces of the puzzle and permission to participate in the journey. That is, we need a model that gave people the skills to make and sustain their own gains but did it in smaller chunks through an interactive curriculum.
In response to this need, PHA under Mark’s guidance, developed a new approach call “Lean First”. Lean First offers four new certification levels: 1) Lean Daily Improvement (LDI) Facilitator; 2) Lean Practitioner, 3) Advanced Lean Practitioner; and 4) Lean Leader. Each level addresses making change and improvements at a different scale. LDI Facilitators are focused on learning how to make small continuous improvements at the point of service while you work. Lean Practitioners are skilled at facilitating cross-functional teams dedicated to making larger improvements that take several days of concentrated effort. Advanced Lean Practitioners look at making transformational change for an entire service line over a 12- to 18-month period. Finally, Lean Leaders are responsible for guiding the lean effort across an entire organization, which can take years.

Our new curriculum reflects our belief that lean never stops. It means learning to make improvements at many levels in the organization while service is being delivered. Clients can master these different levels of change-making through training as well as through observing PHA-run events before they run their own event with the help of a PHA coach. As part of Purdue’s land-grant mission, PHA works with health care organizations to build their capacity for change. Lean First answers our mission and our belief that improvement should never stop and offers powerful tools to keep employees engaged and motivated to make and sustain change.

Building Cybersecurity Expertise with Broader Industries – It is abundantly clear that the world is facing unprecedented cyber security concerns, while at the same time finding ourselves with a dearth of talent. This is true not only for healthcare but also other industries. PHA is working with Purdue’s Office of Corporate & Global Partnerships to begin offering training and certification to increase cyber security skills in a variety of new and experienced personnel. Purdue has a long history in cyber efforts, however these efforts are nascent in non-degree corporate training, including our own efforts in healthcare. By working with colleagues across the University, we can leverage assets and reach a broader offering of capability building to better support our mission of building capacity.

In the past 10 years, healthcare has worked tirelessly to implement electronic health records. Unfortunately, this digitization of health data has lacked the types of human resources/capabilities, infrastructure, and management attention to keep our personal health record information secure. From various studies it is clear that healthcare needs more experienced cyber professionals. It is also clear that the healthcare industry leads in breaches of personal records. Healthcare is competing with all industries to hire scarce talent and is struggling to attract and train this expertise. To help bring cyber training to healthcare, our partnerships with campus colleagues allow us to build infrastructure and training materials and
invest in higher capability training systems. Significant external funding has been awarded Purdue to train several thousand non-healthcare IT professionals in cyber security, and we will leverage this to build healthcare cyber security capacity.

**Transition to More Significant Challenges** – Much of PHA’s work has been helping to build capacity for change for individual providers and hospitals. The result has led to significant improvements at literally thousands of different organizations. Recently, however, we are transitioning to also work on efforts that are significantly more challenging in at least one of two aspects: i) they are community-based, which means there are a number of entities that need to be considered with multiple objectives, and ii) the resulting efforts can be generalizable and replicable at other similar organizations.

A few examples are our current efforts in these more significant challenges include our work on tobacco cessation, opioid harm reduction, and improving long term care systems/ transitions. In our FSSA-funded work on tobacco cessation, we are integrating efforts in public health with healthcare providers to reinvigorate Indiana communities by helping members quit smoking and improving access to tobacco cessation products and counseling services. This is a particularly difficult problem due to the public health component and the behavioral aspect of current smoking cessation efforts. Our work on opioid harm reduction similarly requires integrating efforts in public health, communities, healthcare/behavioral health providers, and various community groups to stem the negative impacts of opioid (substance) use disorder. Clearly bringing key entities in a community together in a coordinated way towards a unified objective presents significant challenges. This is further challenged by our desire is to replicate what is learned in other communities across Indiana and the US. Finally, our work in long-term care is focused around integrating efforts between hospitals and post-acute care facilities to decrease ED usage and lessen hospitalizations. It is important to note that in the last two examples, we are bringing together faculty and staff from both PHA and Purdue. In fact, we are now actively working with over 10 Purdue faculty on these projects. This is a new process for us, and when successful, will help us gain unique insights into system level dynamics and lead to more generalizable solutions.

In the future, we will develop replicable system approaches to significant public health/healthcare problems, such as those mentioned above. In addition, we are excited about developing an approach to utilize lean to deploy evidence, that is, determining how to include evidence into healthcare workflows – including searches, evidence grades, workflows, data collection, and analysis. Finally, we believe that the combination of PHA staff and RCHE faculty is unique in academia – providing not only an ability to research changes in healthcare, but to also include an ability to systematically make changes within healthcare organizations that can be researched. We will therefore work with Purdue faculty and students to collectively find key decision improvements in healthcare, perform analysis, apply advanced data analytics, and deploy changes in workflows that improve critical decisions impacting patient care and provider efficiency.