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Board Summary Report June 2018

Regenstrief Center for Healthcare Engineering

Regenstrief Center
for Healthcare Engineering

Board Summary Report

June 2018

PURDUE UNIVERSITY
Discvery *Park*

Contents

Summary Report

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 briefly discuss the recently signed 2019-2014 Grant Agreement and describe RCHE activities and accomplishments in research, outreach and education since the last report provided to the Program Committee in December 2017. Additional details may be found in the June 2018 Board Supplemental Report.

Discussion of 2019-2024 Grant Agreement

The Regenstrief Foundation has agreed to provide support to RCHE from 2019-2024. This renewal grant differs somewhat from previous grants. In particular, the $2M per year over five years will be distributed as follows:
* $1M as operating funds to RCHE,
* $1M as matching funds to the Purdue Foundation.
For the matching funds, $2M of carryover from the 2014-2018 grant funding will also be provided to the Purdue Foundation for a total of $7M. The Purdue Foundation will in turn raise an additional $7M over the next 5 years creating a total $14M to endow the following activities:
*   Rising Star Professorship – awarded to assistant or associate professors; $500K each,
*   Chaired Professorship – awarded to full professors; $1.5M each,
*   Student Scholarship – awarded to MS and PhD students; minimum of $25K each,
*   PhD Student Fellowship – awarded to PhD students; $1M each,
These endowments will ensure long-term engagement of Purdue faculty and students with the Center.

Operating Budget Update – We have refocused and prioritized our objectives to allow us to operate effectively with the $1M per year operating funds from the Regenstrief Foundation. We are also moving to a subscription-based model for the Regenstrief National Center for Medical Device Informatics (REMEDI), as described later in this report. The net effect is that Regenstrief Foundation funds will no longer be needed to support REMEDI. Furthermore, Purdue University will waive annual facilities operations funds for our space use in Mann Hall in Discovery Park.

Endowment Update – Senior Associate Vice President for Advancement Jay Kahn is serving as the coordinator for the endowment effort. Purdue Development was fully informed of the matching opportunity, and the RCHE Director met with several Deans and School Chairs and their development officers to discuss RCHE's goals and objectives for the endowments. Upon

the signing of the grant agreement in April 2018, we became active in fundraising. There are several proposals being considered by various Purdue Alumni, and two gifts have been secured to this point:

- A student scholarship ($150K gift) is being contributed by the John W. Anderson Foundation and is matched with $150K. The use of the funds will available in January 2019.
- The Gross Rising Star Professorship ($500K gift) in the Weldon School of Biomedical Engineering, which was matched with $500K to create two rising star professorships. The School Head for Biomedical Engineering in consultation with the RCHE Director have nominated two RCHE-affiliated faculty for these positions. If the nominations are approved by the College of Engineering and Provost, the positions will be awarded to the nominees in August 2018.

Purdue Support of RCHE

Purdue University's support of RCHE has included the hiring of RCHE-core faculty and multiple research initiatives that support RCHE-affiliated faculty and their students. We briefly describe five such efforts that occurred in spring 2018.

RCHE-Core Faculty Hiring - The Dean of Engineering (Mung Chiang) newly committed to hiring five RCHE-core faculty in the College of Engineering over the next five years. A search committee of seven faculty was established.

Phone interviews were conducted in December and January, and four faculty were invited to the Purdue University campus for interviews. Two candidates were considered to be exceptional. One of these candidates, **Zachary Hass**, has accepted our offer and will start in August of this year. Zachary holds a PhD in statistics and is completing a postdoc in Purdue's School of Nursing. He will hold a joint appointment in the Schools of Nursing and Industrial Engineering. He is interested in the application of statistical methods to answering questions in health services research. He is currently working on problems related to health outcomes and program evaluation for long term care support and services. Zachary's CV is provided in the June 2018 Board Supplemental Report.

We will reconvene the search committee this summer. In addition, we will develop and post the advertisement for new faculty during the fall semester. We will work to initiate the search in early fall, with a goal of starting interviews by January 2019.

Purdue Data Science Initiative – In March 2018, Purdue developed a request for proposals for transformative research data science in four areas: healthcare, public policy, defense, and data science theory. Efforts in each area were administered by the corresponding institute in Discovery Park; RCHE led the effort in data science in healthcare. Almost half of the received

proposals (24 of 52) were for healthcare. Approximately $800K in funding for a two-year period was awarded in healthcare. Winning proposals included:
- Causally-driven Healthcare Science – From Observational and Experimental Studies to Personalized and Improved Patient Outcomes, PI: Elias Bareinboim, Computer Science
- Fingerprints of the human brain: a data science perspective, PI: Juaquin Goni, Industrial Engineering
- Using the One Health approach for combating antimicrobial resistance (AMR): creating an integrated framework for the collection, analysis, and interpretation of data necessary to establish a comprehensive AMR surveillance system in Indiana, PI Audrey Ruple, College of Veterinary Medicine

College of Engineering Healthcare Initiative – In February 2018, the College of Engineering supported a workshop in Healthcare Engineering. A Biomedical Engineering faculty member and RCHE director facilitated the workshop with two Associate Deans. The result of the workshop was a request for proposals in the area of healthcare engineering. A total of 25 proposals were received and four were selected for funding. A total of $250K was awarded to winning proposals that included:
- A Real-Time Drug Response Tracking System for Precision Medicine, PI: Yuehwern Yih, Industrial Engineering and RCHE Associate Director
- Stretching the Materials Design Frontier in Organic Bioelectronics, PI: Chi Hwan Lee, Biomedical Engineering

Indiana University School of Medicine/Purdue University Initiative – In April 2018, a request for proposals was issued. The goal is to identify and support addiction care technologies that are effective in deterring and monitoring addiction among vulnerable patient populations in both clinical (e.g., neonatal abstinence syndrome) and community (e.g., opioid abuse) setting. A total of $300K will be used to support three proposals. Eligible proposals must include both a Purdue Engineering/RCHE faculty member and an IU School of Medicine faculty member as investigators. Awards will be made in June 2018.

Executive Vice President for Research Equipment Grant – Each year the EVPRP office provides potential funding for equipment to support Purdue researchers. This year RCHE received approximately $100K to construct a 13-node high performance computing environment. This will support the conduct of reproducible and transportable research using heterogeneous health data from the electronic health record, imaging data, and claims. The equipment was received and configured in April 2018.

RCHE Events

The sponsored events and outreach activities described below increased engagement between RCHE and Purdue faculty and students and increased our visibility at the state, national, and international level.

Sponsored Events in spring 2018:
- **REMEDI Pump Collaborative Conference** – Held in the Big 10 Conference Center in Chicago on April 18 - 20. We successfully met our goal of bringing together a

collaborative community of pharmacists, nurses, researchers, and vendors. This had the highest attendance of all REMEDI conferences with over 80 participants and 20 speakers. Participating providers included University of Michigan Health, Ochsner Health, Aurora Health, Medical College of Wisconsin, University of Iowa Hospitals, and Eskenazi Health. Vendors included Baxter, B. Braun, and BD. The heads of the American Society of Health-System Pharmacists, Institute for Safe Medication Practices, ECRI Institute, and Joint Commission also presented.

- **Seminars** – four sponsored in spring. We strategically invited speakers from organizations with which we would like to initiate or increase engagement. Seminars held at Purdue included the Regenstrief Center for Healthcare Engineering **Distinguished Lecture Speaker, given by Padma Raghavan**, Vice Provost for Research and Professor of Computer Science at Vanderbilt. Other seminars in the spring were given by:
  - Wendy Ingram, PhD, Johns Hopkins Bloomberg School of Public Health and Geisinger Health,
  - Pinar Keskinocak, PhD, George Chair of Industrial Engineering at Georgia Tech,
  - Colin Walsh, MD, Biomedical Informatics at Vanderbilt University Medical Center.
- **Faculty Networking Event**s - two held in spring. These events start with two faculty members discussing a healthcare topic (e.g., Data Science in Healthcare), followed by a social time to network.

Outreach Event - In March 2018, RCHE won the bid to host the 2020 INFORMS Healthcare Conference. INFORMS is the leading international organization for operations research and analytics professionals, and is the main professional society for Industrial Engineering, Operations Management, Operations Research, and Analytics. The Healthcare Conference will be held in the summer of 2020 in Indianapolis and will bring together roughly 600 researchers for a three-day meeting. The theme of the conference will be *Connected Care*, and include the subthemes of i) telehealth

operations management, ii) healthcare analytics in the IoT, iii) enhancing the learning capacity of healthcare organizations, and iv) precision health analytics. Executive Vice President **Robert Dittus** from the Vanderbilt School of Medicine and RCHE Director **Paul Griffin** will serve as co-chairs. The Conference will serve as an excellent venue to promote the research at RCHE to an international audience. We will also involve researchers from the Regenstrief Institute and the Indiana University School of Medicine. Note that the 2017 Conference was held in Rotterdam (http://meetings2.informs.org/wordpress/healthcare2017/).

Purdue Healthcare Advisors

Purdue Healthcare Advisors (PHA) is Regenstrief Center's not-for-profit outreach initiative for the healthcare industry. A staff of over 30 specialists consults, coaches, and trains healthcare professionals in various capacities in both hospitals/health systems and physician practices. PHA's three service lines are: 1) health information technology security, 2) process improvement, and 3) quality services, including Medicare payment reform.

We briefly describe and discuss the impact of key consulting activities undertaken by PHA this spring, the launch of an online learning platform and the development of multiple "blended" proposals with RCHE-affiliated faculty.

In 2018, PHA has provided significant provider assistance. This included:
- Engaging nearly 3,000 providers regarding compliance to the Medicare Quality Payment Program for small and under-resourced providers,
- Assisting 164 organizations with Medicaid Meaningful Use requirements, and helped 443 providers successfully attest to get incentives,
- Assisting 16 organizations with implementing chronic care management, transitional care management, and patient-centered medical home care models.

An example of one detailed initiative is the **St. Vincent Care Coordination Call Center** (C4). PHA completed preparation and facilitation of their Centralized Scheduling Value Stream Analysis (VSA), which looked at the end-to-end processes related to centralized scheduling, determined issues/gaps within those process steps and developed a work plan for the next eight months. Examples of the lean events include:
- Staffing to Demand - having the right number of call representatives in place based on current call volumes as well as projected volumes;
- Clinic Onboarding Optimization - they have 49 clinics to onboard by June 2019 and the current process is not ideal;
- Internal Call Center Representative Onboarding and Training - to support the addition of the 49 clinics.

The next steps for this initiative is proceeding with a clinic VSA; the focus is on the Broad Ripple clinic. PHA will work the lean events for Centralized Scheduling and the Broad Ripple clinic over the remaining months of 2018 and look for opportunities to start early integration work. Moving into 2019 PHA will focus on deeper integration and moving/spreading the work efforts to other St. Vincent clinics.

PHA Direct – In March 2018, PHA announced the launch of PHA Direct, a **new online platform** for instruction, coaching and community building. PHA Direct offers the convenience, flexibility, and seamless collaboration options of online (versus in-person) training, using the award-winning D2L Brightspace Learning Management System to offer easy-to-use, interactive, and customized learning experiences. PHA Direct offers **eLearning courses** with easy access to materials to support training and certification programs from PHA.

The platform also offers multimodal, collaborative tools such as the ability to text, email, leave Video and audio comments, post on-discussion threads, blog or otherwise interact with colleagues and PHA experts.   Finally, in May the **kCards** feature was rolled out as a soft-skill approach to behavioral change. It provides users with small-step, daily exercises to master new skills in the areas of team facilitation, change making, lean leadership, resilience and more.

Blended Proposals – As mentioned in the December 2017 report to the Program Committee, it is a goal of RCHE to focus on implementation science in healthcare delivery by having RCHE-

affiliated faculty and PHA staff work together on proposals when appropriate. We believe that having PHA together with academic faculty addressing healthcare improvement from a system's perspective is unique to RCHE. As examples of this type of collaboration, two proposals, each at roughly $4M over two years, were submitted in April to the Centers for Medicaid & Medicare Services (CMS):

- *An HIT-Enabled Community-Wide Approach to Opioid Treatment* – the goal is to improve patient care regarding opioid addiction treatment and referral coordination in Northeast Indiana. We will make improvements through advanced Meaningful Use and referral management, system analysis design, and community involvement, for regional mental health and addiction, primary care, hospital, and specialty care providers. Efforts are intended to reduce opioid prescribing, increase usage of the State INPSECT drug prescription monitoring system, and increase referrals and treatment to addiction services. This includes RCHE faculty and graduate students from the Schools of Nursing and Industrial Engineering, and the College of Pharmacy.
- *Cost Effective Quality Care for Indiana's Long-Term Care Medicaid Patients* – the goal is to improve the quality and cost of care for Indiana Medicaid (LTC) patients in a target region within the state. Improvements will be made through enhanced meaningful use compliance, analytics, technology and efficient processes designed for evidence-based *care transitions and medication management* within the region. This will reduce unnecessary ED visits and hospital admissions. This includes RCHE faculty and graduate students from the Schools of Nursing, Biomedical Engineering, and Industrial Engineering, and the College of Pharmacy.

We will continue to develop this unique relationship.

Research Activities

Our support of research efforts also has become more strategic. First, we have worked to develop a few key partners with whom we have a strong synergy and can find much potential research in common from a strategic perspective. Second, we have actively recruited faculty with specific skill sets the build the capabilities we need to address our three research themes. Finally, we have put a greater emphasis on externally funded research, including the blended research proposals with PHA.

RCHE-Affiliated Faculty - From January 2018 to the writing of this report, we have targeted growth in some specific areas for RCHE-affiliated faculty based on our strategic plan. These included faculty in the areas of data science in healthcare, precision care, and point of care monitoring for improved access. As a result, the number of RCHE clinical and faculty affiliates has grown from 24 to 35 members. Brief descriptions of the new affiliates are provided in the June 2018 Board Supplemental Report. We have already collaborated on proposals together with all new affiliates and several have started collaborative research projects with us. Some award highlights of our new faculty-affiliates since January include:

- **Elias Bareinboim** won the NSF Faculty Early Career Development (CAREER) award, one of the most prestigious NSF honors for outstanding young researchers in science and engineering
- **Mohammad Rahman** was recognized as a World's Top 40 Business School Professors under 40 by Poets and Quants.

- **Barrett Caldwell** received the 2018 College of Engineering Faculty Award of Excellence
- **Wenzhou Wu** won first prize for the Best Early Career Research published by *Semiconductor Science & Technology (SST)*

RCHE- Research – In an effort to pursue a proactive, patient-centered, and wellness-focused healthcare delivery system, we have supported research efforts in our three strategic areas: i) data science in healthcare systems, ii) capacity management, and iii) improved access. In addition, we work to continually develop strategic partnerships. Current supported efforts underway at RCHE are provided in the following Table (five examples for each area). Note that support can come in the form of student support, data/IT support, involvement of RCHE research scientists or other staff. In many cases, this support was leveraged into a corresponding research proposal or externally sponsored project.

Topic	RCHE Researchers	Clinical Partner/ Researchers
AREA: Data Science		
Risk stratification for atrial fibrillation for patients with transient ischemic attack or stroke	Xiao Wang (Statistics) and Md. Adibuzzaman (RCHE)	Ramin Zand, MD (Geisinger; Director of Clinical Stroke Operations) and Vida Abedi, PhD (Geisinger; Biomedical and Translational Informatics)
Framework software for integrated data-driven reproducible research to support healthcare delivery	Ananth Grama, Jerimiah Blocki, and Aniket Kate (Computer Science), and Md. Adibuzzaman (RCHE)	Bipin Karunakaran, MS MBA (Geisinger; Vice President of Enterprise Data Management)
A real-time drug response tracking system for precision medicine	Rex Reklaitis (Chemical Engineering) and Poching DeLaurentis (RCHE)	Riley Hospital; Critical Care Medicine
Personalized thresholds via boosting for sepsis screening	Paul Griffin (RCHE)	Shravan Kethireddy, MD (Geisinger; Critical Care Medicine) and Yajun Mei, PhD (Georgia Tech)
Explanatory artificial intelligence: structural causal models for acute respiratory distress syndrome treatment	Elias Bareinboim (Computer Science) and Pavlos Vlachos (Mechanical Engineering)	Marvi Bikak, MD (IU School of Medicine; Pulmonary CCM Fellow)
AREA: Capacity Management		
Improving health outcomes and efficiency in chronic obstructive pulmonary disease	Joseph Thomas (Pharmacy) and Yuehwern Yih (Industrial Engineering)	IU Health Goshen Hospital
Optimizing trauma care network design	Nan Kong (Biomedical Engineering)	Pratik Parik, Wright State University; Boonshoft School of Medicine

Topic	RCHE Researchers	Clinical Partner/ Researchers
Engineering kangaroo mother care	Yuehwern Yih (Industrial Engineering)	Save the Children (Uganda)
The impact of infusion practices on nursing outcomes	Ben Dunford (Krannert School of Management)	Four nursing associations in the US and Canada
Modeling return on investment in self-management education and home visits for children with asthma	Paul Griffin (RCHE)	Joy Hsu, MD, Tusynbek Nurmagambetov, PhD, and Christa Singleton, MD (Centers for Disease Control)
AREA: Improving Access		
Non-invasive anemia detection	Young Kim (Biomedical Engineering) and Md. Munirul Haque (RCHE)	A. Suvannasankha, MD (IU School of Medicine; Hematology and Oncology)
Mobile-based care for children with autism spectrum disorder using remote experience sampling method (mCARE)	Amy Schwichtenberg (Human Development and Family Services) and M. Munirul Haque (RCHE)	University of Toronto and BSMMU, NIMH in Bangladesh
Demand sensing to support maternal and newborn health	Yuehwern Yih (Industrial Engineering) and Seokcheon Lee (Industrial Engineering)	Gates Foundation; ResilietnAfrica Network; Management Sciences for Health (Uganda)
Highly-sensitive, low-cost paper-based molecular diagnostic platform	Jacqueline Linnes (Biomedical Engineering)	Charlotte Gaydos, DrPH (Johns Hopkins School of Medicine)
mHematology for care and management of sickle cell patients in sub-Saharan Africa	Young Kim (Biomedical Engineering) and Md. Munirul Haque (RCHE)	Martin Were, MD (Vanderbilt School of Medicine; Department of Biomedical Informatics)

Brief summaries of the listed research projects are provided in the June 2018 Board Supplemental Report. We also provide a list of peer-reviewed publications that have appeared in the past 9 months.

We continue to leverage new partnerships to increase the level of external funding. As mentioned previously, we also continue to develop a blended model of research between academic faculty and PHA staff to advance implementation science and dissemination. Finally, our research is applied in order to help inform policy and practice leading to more effective and efficient healthcare delivery.

Other Activities – In addition to the projects described in the Table, RCHE continues to help address opioid mitigation through a relationship with the Purdue's College of Pharmacy and Purdue Extension.   Although this doesn't directly fall into our strategic areas, RCHE plays an important collaboration role for Purdue. Activities include helping to start up a 2,000 patient per day methadone clinic in Ft. Wayne, IN, working with BoilerWorRx for naloxone training and distribution, educational programs, helping with treatment capacity, etc.

REMEDI - The Regenstrief National Center for Medical Device Informatics (REMEDI) is an evidence-based community of practice that uses a collaborative HUB to collect data that has been captured and stored on medical devices such as smart infusion pumps. REMEDI enables vendor-neutral analytics and reporting to improve patient safety. From January 2018, the number of participants has grown from 292 hospitals in 23 states to 341 hospitals in 27 states.

The REMEDI activity has been supported by funding from the Regenstrief Foundation for over four years. The interest from the collaborative has grown to the level where we believe we can now make the activity self-supporting through a subscription-based model.

RCHE Financials

Over the past year, funding provided by the Regenstrief Foundation was used in the following three categories: i) management (administrative staff, programmer analysts, business office staff) ii) research projects (graduate students, undergraduate students, research scientists, clinical advisors), and iii) Miscellaneous (travel, faculty search, speakers, computer equipment, IT support, etc.). The annual expenditures in each category was:

Area	Amount
Management	$ 565,174
Projects	$1,288,165
Miscellaneous	$ 65,436
Total	**$1,918,775**

Over the same period, the total amount of external research funding for RCHE was $8,353,565. This is a greater than **4 to 1 leverage** of Regenstrief Foundation funds.

One Year Action Plan

The metrics for the 2017-2018 One Year Action Plan as discussed in the December 2017 Program Committee Report are provided in Appendix A. Of the 26 metrics, we successfully achieved our goals for 19 of them. We partially achieved our goals for four metrics and did not complete our goals for three. For the partially completed goals, the most important was with respect to RCHE core faculty hiring. Our goal was to hire two faculty and we only successfully hired one. As a result, we will change our process for the next year. Most importantly, we will start the process earlier, be more specific in our faculty advertisement, and be more proactive in our search. For the three metrics we did not meet, two of them were poorly defined. Namely, the MS program in Health Systems will not be initiated until later this year, and so we did not have the opportunity yet to develop appropriate internships. Similarly, the RCHE Scholars program will begin in January 2019 after initial endowments are established. The third metric that we did not meet was establishing a pilot funding program with the Regenstrief Institute, although there are multiple RCHE-affiliated faculty working on externally sponsored research with faculty from the Regenstrief Institute. This will require more significant effort by the RCHE director.

Based on input from the External Advisory Committee and Faculty Leadership Committee, we have made changes for our 2018-2019 One Year Action Plan, as provided in Appendix B. Some of the important new metrics are around fundraising to match the Regenstrief Foundation funds for establishing $14M worth of endowments. We have also included metrics to increase our involvement with clinical researchers, in particular, the Indiana University School of Medicine. In addition, since REMEDI is being moved to a self-supporting endeavor, we will not track it for reporting the Regenstrief Foundation. Finally, 2019 is the 150th anniversary of Purdue University. Purdue will be hosting the 150 Years of Giant Leaps celebration over the year, with health identified as one of the four key themes. This will provide several opportunities for RCHE leadership and engagement.

Conclusions

Over this year we have solidified our foundation to increase meaningful engagement between Purdue and RCHE faculty. In particular, we have hired core faculty and revised our search process to be more effective, increased our faculty affiliates to have sufficient capacity to address our research themes, and have begun the process of raising funds to provide additional faculty and student endowments. We will award two new endowments, Rising Star Professorships, this fall. We have also formed strategic partnerships with clinical researchers outside Purdue to gain access to needed subject-area expertise and data. Two examples of such partnerships are collaborations with Geisinger Health and Christiana Care. Finally, we are now using PHA's unique expertise and relationships with clinical care providers in a blended form of research that explicitly considers implementation science. As a result, we have increased the number of submitted research proposals for significant levels of external funding from agencies such as the National Institutes of Health and the CMS. In addition, most of our supported work now includes the direct involvement of clinical researchers.

For **PHA**, there are two key goals: to expand the online training environment and community of practice for PHA Direct and to continue to develop blended approaches to research with RCHE-affiliated faculty and students. The CMS funding described earlier will provide a significant opportunity to develop this approach as well as improve long term care and provider response to substance abuse for Indiana. For **REMEDI** we will continue to focus on improving patient safety and quality by supporting the collaborative community with new and improved tools but will also implement a subscription-based membership model so that future efforts will be self-supporting.

We will continue to leverage several Purdue investments including the data science and life science initiatives – how we have directly benefited from internal funding has been described earlier. We are also beginning to plan for our participation in Purdue's 150th anniversary.

The renewal of funding by the Regenstrief Foundation will allow our faculty and students, together with our clinical research partners, to address important issues in healthcare delivery that directly impact the health and wellness of the population. The funded endowments, made

possible through this funding, have also provided RCHE with a means to maintain long term engagement with Purdue faculty and students.

APPENDICES

APPENDIX A: **2017-2018 Action Plan Metrics**

APPENDIX B: **One-Year Action Plan, 2018-2019**

Appendix A: 2017-2018 Action Plan Metrics

We summarize our metrics for the one-year action plan for 2018-2019 in the following table.

Table 1. Timing of Regenstrief Center action plan activities and goals. Green signifies that we achieved the goal, yellow signifies that we partially satisfied the goal, and red signifies that we did not achieve the goal.

	2017			2018		Goal	Current Metric
	Q2	Q3	Q4	Q1	Q2		
Faculty Recruitment							
Write specifications for Regenstrief Center faculty positions						Define positions	Ad placed
Form faculty search committees (a) and conduct searches (b)		a	b	b	b	Hire 2 faculty	Hired 1 faculty
Define Regenstrief Center faculty affiliate requirements and recruit						12 faculty affiliates	34 faculty affiliates
Define Regenstrief Center faculty leadership guidelines/support and recruit						Recruit faculty	Faculty Recruited
Student Recruitment							
Develop Regenstrief Center Scholars program (a) and recruit (b)	a	b		b		5 Regenstrief Center scholars	0 scholars
Engage undergraduate capstone design with Regenstrief Center efforts						4 capstone projects	4 capstone projects
REMEDI Engagement							
Pilot project matching REMEDI data and EHR						1 pilot project	1 pilot project (Cameron)
Determine "value" of REMEDI and revenue model						Recommend-ation	Subscription Model Developed
Add REMEDI and PSO members						30 REMEDI, 2 PSO	
PHA Engagement							
Involvement of Regenstrief Center faculty in projects with PHA						3 faculty	5 faculty
Involvement of student interns from MS program with PHA						2 interns	0 interns[1]
External Advisory Board							
Identify and recruit members for External Advisory Board						7 members	7 members
Hold first External Advisory Board meeting						Hold meeting	Meeting held

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[1] MS program does not start until Fall 2018.

Communicating Regenstrief Center Success								
Webpage overhaul (a) and brochure update (b)		a	a,b	a	a		Implement changes	Brochure updates, webpage in progress
Invite speakers for distinguished seminar series							2 speakers	2 speakers
Plan for fall Regenstrief Center Forum and establish co-sponsor partnership							Co-sponsor	Co-sponsored forum (Women's Health)
Hold fall Regenstrief Center Forum							Hold forum	Forum Held
Establish a process for press releases							Implement plan	Plan implemented
Press releases of Regenstrief Center accomplishments							3 per quarter	6 press releases
Publish Regenstrief Center e-newsletter							Monthly	e-newsletter published monthly
Funding								
Identify funding opportunities and submit proposals							8 proposals, $3M	Exceed both metrics
Support large grant initiative (> $5M)							1 proposal	Part of large grant initiative
Develop pilot research opportunity with Regenstrief Institute that is externally funded							1 project	0 projects
Management								
Establish an Internal Advisory Board for funding review							Implement plan	Internal Board formed; plan implemented
Strategic Planning								
Regenstrief Center Faculty Leadership input for 2018-2019 action plan								Input received (December meeting)
Evaluate metrics and update Regenstrief Center strategic plan								Metrics evaluated and will be updated (December meeting)
Submit updated plan to Regenstrief Foundation for approval							June 2018	Metrics and update provided in June Report

Abbreviation key:
MS – Professional master's degree in Healthcare Engineering
PHA – Purdue Healthcare Advisors (http://pha.purdue.edu)
PSO – Patients safety organization (https://pso.ahrq.gov)
Regenstrief Center – Regenstrief Center for Healthcare Engineering
(http://www.purdue.edu/discoverypark/rche/)
REMEDI – Regenstrief National Center for Medical Device Informatics
(https://catalyzecare.org/remedi)

Appendix B: Metrics for 2018-2019

In this Table we summarize one-year action plan and goals.

Table 1. Timing of Regenstrief Center action plan activities and goals.

	2018		2019		Goal
	Q3	Q4	Q1	Q2	
Faculty Recruitment					
Write specifications for Regenstrief Center faculty positions	█				Define positions
Form faculty search committee (a) and conduct search (b)	a	b	b	b	Hire 1 to 2 faculty
Recruit faculty affiliates					10 new faculty affiliates in targeted areas
Identify 2 Rising Star Professors in Biomedical Engineering (Gross)		█	█		2 faculty
Development					
Raise matching funds for endowments	█	█	█	█	Raise $2M in matching funds
Leverage Purdue Activities					
Participate in Purdue 150 Anniversary Event (150 Years of Giant Leaps)			█		Develop and deliver RCHE-based programs in the theme of health
Engage undergraduates in research through Purdue data science initiative			█		Actuarial science summer program and 20 students in the "Data Mine"
Engage IU School of Medicine					
Recruit IU School of Medicine fellows as research partners	█	█	█	█	At least 2 Fellows
Participate in joint proposals	█	█	█	█	At least 3 joint proposals
Student Recruitment					
Develop Regenstrief Center Scholars program (a) and recruit (b)			a	b	1 Regenstrief Center scholar (using Endowment)
Engage undergraduate capstone design with Regenstrief Center efforts, including industrial and biomedical engineering	█		█		4 capstone projects
Participate in DURI and SURF undergraduate research programs	█	█	█	█	At least 1 DURI student and 1 SURF student
PHA Engagement					
Involvement of Regenstrief Center faculty in projects with PHA	█	█	█	█	4 faculty
Involvement of student interns from MS program with PHA				█	2 interns
External Advisory Board					
Hold External Advisory Board meeting and conference calls		█		█	Hold meetings

Communicating Regenstrief Center Success					
Webpage overhaul	■	■			Implement changes
Invite speakers for distinguished seminar series		■		■	2 speakers
Plan for Regenstrief Center Forum and establish co-sponsor partnership	■				Co-sponsor
Hold fall Regenstrief Center Forum		■	■		Hold forum
Press releases of Regenstrief Center accomplishments	■	■	■		2 per quarter
Publish Regenstrief Center e-newsletter	■	■	■		Bi-weekly
Funding					
Identify funding opportunities and submit proposals	■	■	■	■	8 proposals, $6M
Support large grant initiative (> $5M)	■	■	■	■	1 proposal
Strategic Planning					
Regenstrief Center Faculty Leadership input for 2019-2020 action plan			■		
Evaluate metrics and update Regenstrief Center strategic plan			■	■	
Submit updated plan to Regenstrief Foundation for approval				■	June 2019

Abbreviation key:

MS – Professional master's degree in Healthcare Engineering

PHA – Purdue Healthcare Advisors (http://pha.purdue.edu)

Regenstrief Center – Regenstrief Center for Healthcare Engineering (http://www.purdue.edu/discoverypark/rche/)