ICES

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From: Alan Russell, Director Disruptive Health Technology Institute, Highmark Distinguished Career Professor, CMU

Date: March 30, 2013

Subject: Request for Proposals in 2013

Background

Over the last year CMU has built a strategic relationship with Highmark, Inc. Insurance companies are key stakeholders in the health care industry but they have not generally participated in proactive research and innovation in order to simultaneously increase the affordability, simplicity, and accessibility of healthcare. CMU will shortly announce the formation of a Disruptive Health Technology Institute (DHTI) that has been launched with support from Highmark and the Heinz Endowments. DHTI is designed to facilitate research that lies at the intersection of science, engineering, business and healthcare delivery. DHTI's link to Highmark Health Services and Highmark's new Integrated Delivery System, which is defined within a Master Research Agreement, will create an environment where innovation in healthcare can be tested in a clinical setting, rapidly translated and delivered to patients.

Over the next two years $2.5 million will be available to teams of researchers that are seeking seed funding for projects that might reasonably be expected to show significant results within 1-2 years. We then expect the relationship to expand with more than $2.5 million/year being available for research. We expect to be in a position to fund 5-10 initial projects. Through a series of research retreats we have identified areas of particular interest, but we hope to expand the program beyond those foci as we move forward.

A Joint Research Committee has been established and they are requesting brief proposals that will be peer reviewed for both technical and business relevance. Individual projects will be funded through this mechanism and each project will proceed with project-specific deliverables. The JRC is charged with trying to focus on science and engineering that is not subject to exclusive licenses with third parties. There is a real desire to use this funding to stimulate interdisciplinary collaborations between clinicians who are part of the Highmark Integrated Delivery Network and CMU faculty. The JRC will meet quarterly to assess progress in each of the projects and will need input from the project PI's on a quarterly basis.

Funds are available immediately to support research.   Proposal budgets should include indirect costs.

The deadline for receipt of proposals is April 30, 2013. Funding decisions will be made within 45 days.

 Request for proposals

DHTI is seeking proposals from CMU faculty directed at addressing pressing issues in health care and improving community health and wellness. Proposals will be competitively reviewed based upon the following factors:

1- Potential to positively impact a large population and provide a substantial healthcare cost savings
2- The likelihood that success would improve quality of life and/or safety for patients
3- Inclusion of tangible work products / deliverables that represent meaningful (further fundable) milestones if successful
4- PI experience
5- Technical risk (moderate risk is acceptable)

Awards are intended to primarily support graduate students and other non-faculty salary related expenses at CMU under the supervision of researchers who would be committed to working to transition new technologies to a clinical setting or practice in the field. Projects are expected to have a 1-2 year duration and generally range in cost between $100-300k (Total cost including full indirect cost). In this, DHTI's first, solicitation, preference will be given to projects that offer near-term deployment potential. Future solicitations will focus on longer-term development programs.

Proposals shall consist of the following:

- Completed proposal template with budget form (included in this document)
- 3-4 page white paper including brief description of background, technical approach, relevant work experience of the team and the value proposition for the innovation
- Quad chart (template included with this document)
- Budget (CMU costs only)

We have identified technical focus areas (below) in which we believe innovation is likely to lead to rapid gains in healthcare quality and affordability. DHTI specifically seeks proposals in the technical focus areas listed below BUT other areas may also see similar gains from innovation and technology. Applications from these areas are also strongly encouraged, provided they meet the criteria for leading to measurable, short term, impact on healthcare quality and affordability.

Technical focus areas:

- **Accessibility of medical diagnostics**: Medical diagnostics continue to improve in their ability to detect biomarkers for diseases and the symptoms brought on by such diseases. Oftentimes improvements to lab tests and imaging come at a significant financial cost, adding significantly to the total cost of healthcare.[1] This focus area seeks the development of diagnostic tests that

are simple and inexpensive to administer, are widely accessible to the general population, and may identify conditions that will alert a patient to a significant health risk. The tests need not be definitive but should have sufficient sensitivity and specificity to generate a referral to a medical specialist without imposing a financial burden on the patient and payer.

1- http://www.time.com/time/health/article/0,8599,2053354,00.html

- **Behavioral change:** The manner in which the population thinks about health care, health and wellness programs, prevention, and medically directed program compliance needs to change to positively impact quality of life and reduce health care costs.[2] Societal and religious views on end of life and advanced directive programs significantly impact perception and utilization of palliative care and hospice programs.[3] Physicians practice medicine based on their training and experience within a fee for service model and changes to physician behavior are slow to propagate without significant financial motivation and assurances related to legal liability. We seek proposals directed toward understanding the underlying issues driving the decisions that parties make related to healthcare and propose approaches to influence decisions that may lead to better outcomes and reduced healthcare costs.

2- Unhealthy behaviors impacting quality of life, costs. Stephanie Bouchard. Healthcare Finance News. December 11, 2012. http://www.healthcarefinancenews.com/news/unhealthy-behaviors-impacting-quality-life-costs
3- Cultural and religious aspects of palliative care. Steven M Steinberg. Int J Crit Illn Inj Sci. 2011 Jul-Dec; 1(2): 154–156. 10.4103/2229-5151.84804. http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3249849/

- **Chronic disease management:** Chronic diseases such as diabetes, CHF, and COPD are major contributors to US healthcare spending.[4] There are many initiatives underway to educate the population on key risk factors, improve disease management and improve patient compliance with prevention and treatment programs. This topic seeks novel and innovative programs that may lead to improved outcomes and reduced system-wide costs for caring for this patient population.

4- STATISTICAL BRIEF #331: Top 10 Most Costly Conditions among Men and Women, 2008: Estimates for the U.S. Civilian Non-institutionalized Adult Population, Age 18 and Older. Anita Soni, PhD. Agency for Healthcare Research and Qualit. http://meps.ahrq.gov/mepsweb/data_files/publications/st331/stat331.shtml

- **Data mining and machine learning:** Healthcare payers have medical claims data that is commonly used for member risk stratification, pricing insurance products, and financial reporting to regulatory agencies. A number of recent partnerships between data holders and analytical firms profess to make use of data for identifying healthcare trends, non-traditional

disease markers, and a variety of ancillary uses.[5,6] This focus area seeks for the development of automated tools that use healthcare claims data in (among others):

- o Improving the accuracy of medical claims coding
- o Identifying fraudulent or errant claims
- o Identifying significant outliers from commonly accepted medical practices
- o Detecting trends that may identify new risk factors for future member adverse events

5- Challenges of Using Medical Insurance Claims Data for Utilization Analysis. Patrick T. Tyree, AA, Bonnie K. Lind, PhD, and William E. Lafferty, MD. Am J Med Qual. 2006; 21(4): 269–275. 10.1177/1062860606288774. http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1533763/

6- Numbers, Numbers and More Numbers. Health-care players are finding that crunching the numbers can pay off in both better care and lower costs. SHARA TIBKEN Wall Street Journal Thursday, February 14, 2013 http://online.wsj.com/article/SB10001424052702304692804577285821129341442.html

- **Improved endoscopy:** The frequency with which endoscopic procedures are conducted continues to increase. Endoscopy is regularly used in applications ranging from monitoring of the gastrointestinal tract to arthroscopic surgery. Video data coming from the scope is used by physicians to diagnose disease or direct therapy. Recent developments in endoscopy include capsule endoscopy and the use of endoscopes to build three dimensional maps of organ systems for triangulating anomalies. This technical focus area seeks further advancements in using endoscopic data for improvements in the detection and/or treatment of medical conditions. Proposals offering pathways to less expensive endoscopic procedures and improved accessibility to screening programs are of particular interest.

- **Improved diagnostic ultrasound:** Sonography is a relatively inexpensive and proven imaging technology that is broadly used across healthcare. Improved usability and portability of modern ultrasound equipment has expanded usage in obstetrics and both pre-hospital and hospital emergency department applications.[7] This area seeks projects focused on the following:
    - o Replacing expensive diagnostic procedures with ultrasound
    - o Use of ultrasound as a prescreening technique before moving to more expensive diagnostic tests
    - o Combining ultrasound and other medical technologies to reduce the risk of expensive complications
    - o Development of new ultrasound technology or systems offering novel capability

7- Ultrasound in emergency medicine: a colorful future in black and white. Anunaya R. Jain & Latha Stead &Wyatt Decker. Int J Emerg Med (2008) 1:251–252. DOI 10.1007/s12245-008-0078-3. http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2657256/pdf/12245_2008_Article_78.pdf

- **Infection prevention / mitigation:** The US Centers for Disease Control and Prevention estimates that preventable infections cost the US healthcare system approximately ~ $40 billion annually.[8] It is also estimated that 60% of all infections are caused by biofilms, often difficult to treat complex collections of microorganisms that propagate at a solid substrate. Particularly costly infections include chronic sinusitis, infected implants and prosthetic joints, ventilator associated infections (pneumonia), and infections within chronic wounds. Proposals to reduce infection prevalence, cost, associated complications, and overall impact on patients are sought. Programs that address the issue of antimicrobial resistance and chronic infection and therefore have the greatest potential to reduce the system costs driven by infections are of greatest interest. Proposals that address the prevention and treatment of hospital acquired infections are also of real interest.

  8- The Direct Medical Costs of Healthcare-associated Infections in U.S. Hospitals and the Benefits of Prevention. Centers for Disease Control and Prevention. http://www.cdc.gov/HAI/pdfs/hai/Scott_CostPaper.pdf

- **Other:** This is an open ended topic for proposals that have the potential to improve the simplicity, accessibility, and cost of healthcare while enhancing the overall quality of life of members and patients. Applications submitted to this area should include a clearly defined value proposition for the proposed innovation as well as estimates on the number of impacted individuals and financial savings should the effort be successful.

TECHNICAL PROPOSAL TEMPLATE

DISRUPTIVE HEALTH TECHNOLOGIES INSTITUTE

SOLICITATION #1 – 2013

> **INSTRUCTIONS**: *Please use this form to submit your proposal. Fill-in complete answers for all questions. Submit this form and a white paper (not to exceed 4 pages) along with your completed budget form (see below)* **no later than April x, 2013**.

1.   **Project Title:**

2.   **University Research Team:** List PI's (name, affiliation and email address) and anticipated student involvement (name, degree program, anticipated completion date, curriculum/department)

PI:

Graduate Students:

Undergraduate Students:

3.   **Any Non-University Project Participants:** List name and ***complete address including zip code*** of company or agency as well as a point of contact (name, title, and email address)

Non - University Partner:

Partner PoC:

4.   **Executive Summary (Abstract) of Project:** *(limit of 200 words; executive Summary will be used for public dissemination if project is awarded)*

5.   **Please identify the technical focus area to which this proposal is directed:**
  ☐ Accessibility of medical diagnostics
  ☐ Behavioral change
  ☐ Chronic disease management
  ☐ Data mining and machine learning
  ☐ Improved endoscopy
  ☐ Improved diagnostic ultrasound
  ☐ Infection prevention / mitigation
  ☐ Other

6.   Proposed period of performance:

months

7.   Anticipated work product and the value that it represents:

8.   Relationships with third parties and plans for future funding:

Budget

USE FULL FEDERAL INDIRECT COST RATE

Project title
Key participants, organizations, complete contact info for PI

Objective
- What is the purpose of the proposed work?
- Background

Illustration / Image with caption

Importance / potential impact to healthcare
- Societal impacts
- Economic impacts
- Patient impacts

Approach
- What work will be done
- Why this effort is likely to succeed
- Technical risks

Milestones / Budget / Timeline
- Milestone   Month achieved after start
- Milestone   Month achieved after start

- Key work product resulting from this effort

- Period of performance of effort
- Budget by year