



Carnegie Mellon University Disruptive Health Technology Institute

Disruptive Health Technology Institute | Hamburg Hall | Carnegie Mellon University | 5000 Forbes Avenue | Pittsburgh, PA 15213 | 412-268-6920

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RE: Request for Proposals

Background

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. Carnegie Mellon's commitment to research and technology development creates affordable, accessible and effective healthcare solutions and was the force behind the creation of the Disruptive Health Technology Institute (DHTI) in 2013. Research led by Carnegie Mellon University, is supported by generous funding from Highmark Health. Both organizations are dedicated to working collaboratively to create solutions that will impact large populations, have the ability to provide substantial healthcare savings and lead to improvements in patient safety and quality of life. The parent company of Allegheny Health Network and HM Health Solutions, Highmark Health today leads a national health and wellness enterprise that ranks as America's third largest integrated healthcare delivery and financing system. The enterprise employs more than 35,000 people who proudly serve 40 million Americans in all 50 states. As such, Highmark Health is uniquely positioned to understand the importance of value-targeted innovation.

DHTI's link to Highmark Health and the Allegheny Health Network, which is defined within a Master Research Agreement, will foster innovation in healthcare that can be tested in a clinical setting, rapidly translated and delivered to patients.

Over three years \$5.4 million has been made available to 38 teams of researchers that were awarded seed funding for projects that might reasonably be expected to show significant results within 1-2 years. In this round of funding, we expect to be in a position to fund 5-10 projects. In addition to on-going research retreats, priority defining sessions within Highmark Health and AHN have identified areas of particular interest that serve as focus areas for project submissions. DHTI areas of focus have continued to expand beyond the initial identified areas as we monitor and examine issues and unmet clinical needs as they pertain to the delivery of healthcare solutions.

The DHTI Joint Research Committee (JRC) is 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 focusing on science and engineering that is not subject to exclusive licenses with third parties. There is a real desire to use DHTI funding to stimulate interdisciplinary collaborations between clinicians who are part of the Allegheny Health Network and CMU faculty. The JRC meets regularly to assess progress in each of the projects requiring input from the project PI's on a quarterly basis.

PLEASE NOTE: Although there is a preference for funded projects to work in collaboration with Allegheny Health Network clinicians, DHTI funding has **no restricted covenants and no exclusivity clauses** to prevent you from working with other organizations on additional projects. Accepting funding from DHTI in no way will impact a faculty member's ability to accept funding on a different project from any other sources. All IP developed in DHTI sponsored projects is owned by CMU and the funder is given a first right of refusal to license the IP for commercial purposes.

Proposal Process: Funds are available immediately to support research. Discussions with PIs will be initiated in April and funding decisions for a June 30 start date. DHTI will be delighted to discuss details and field any questions prior to the investigator's submission. Please contact cemig@cmu.edu (x85214) and visit www.engineering.cmu.edu/dhti to review the online submission forms.

Two information sessions will be offered to answer any questions regarding technical focus areas, pre-Award and post-Award activities and requirements and/or preparation of proposals. These will be held in 6002 Scott Hall.

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:

- The likelihood that success would improve quality of life and/or safety for patients
- The impact on potentially lowering healthcare costs if successful
- Inclusion of tangible work products / deliverables that represent meaningful (further fundable) milestones if successful
- Science/Engineering
- PI experience
- Novelty of approach
- Technical risk (moderate risk is acceptable)

Awards are intended to support research that identifies disruptive health care innovations which can be clinically tested and rapidly delivered to a clinical setting or practice in the field. The research team for the project must be in place and details about the team should be included in the proposal submission. Fully funded projects are expected to have a 1-2 year duration and generally range in cost between \$100-300k (Total cost including full indirect costs). Proposal budgets that reflect an effort to minimize costs while delivering high impact have an increased chance of being funded. **Preference will be given to projects that offer near-term deployment potential.**

Based on the results of several years of strategic horizon-mapping and subject matter retreats, key areas have been identified in each funding cycle as areas of focus for the institute. Since 2013, DHTI has reviewed 145 project proposals and awarded \$5.4M to 38 projects.

Proposals shall consist of the following:

- Completed proposal template with budget form (template available at www.engineering.cmu.edu/dhti)
- White paper not to exceed 8 pages including brief description of background and technical approach
- Work experience of the team and the value proposition for the innovation
- Quad chart (template available at www.engineering.cmu.edu/dhti)
- Budget (CMU costs only) (template available at www.engineering.cmu.edu/dhti)

We have identified technical focus areas 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 we are open to any proposals that the faculty deems relevant, provided they meet the criteria for leading to measurable, short term, impact on healthcare quality and affordability.

Technical Focus Areas

I. Pain and Addiction Management: Leading pain medications often lead to addiction and can negatively impact both patient lives and costs within the healthcare system. Many patients need better solutions for managing chronic pain and pain during and after medical procedures. Patients also need solutions that are less likely to lead to addiction, or interventions that can lead to the early identification of and alleviation of addiction. We seek solutions that manage pain while minimizing addiction and/or interventions to help people end their addictions to pain medications.

We are interested in engineered solutions that will:

- Manage pain while minimizing addiction
- Identify those struggling with addiction
- Intervene to end addiction

II. Optimization of Drug Delivery: We are interested in improving the efficiency of drug delivery to ensure that expensive medicines have the intended impact with minimal doses. If successful, proposals will minimize side effects for patients and save money for the healthcare system. We seek proposals that improve the targeting of delivery or efficiency of drugs in the human body to optimize the intended effect while reducing costs and improving patient lives.

We are interested in solutions that will:

- Optimize drug dosing through better targeting
- Improve how long drugs remain in the body and are efficacious

III. Medical Diagnostics: Medical diagnostics continue to improve in their ability to detect biomarkers for diseases and the symptoms brought on by such diseases. 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 or payer.

This focus area is not limited to technologies that identify which patients have a specific disease but also in diagnostics that can be used to support clinical development of drugs, predict disease before symptoms begin, forecast the progress of a disorder, and identify patients who are most likely to respond (or not respond) to specific treatments.

In addition, medical diagnostics in the home are increasing in number and effectiveness. These can detect possible health conditions when no symptoms are present to allow for earlier treatment and monitor conditions to allow frequent changes in treatment, lowering the chance of developing later complications.

Another area of rapid growth is in the use of “omics” to target therapies to patients. The advent of affordable human whole genome sequencing opens the door to combining sequence data with claims and health data in order to predict wellness.

We are interested in solutions that will:

- Develop in-home diagnostic tests to promote wellness
- Enable preventative personalized medicine
- Use advanced data analytics to extract meaning from genomic and claims data

IV. Chronic Disease Management: Chronic diseases and conditions such as heart disease (chronic heart failure), COPD, stroke, cancer, and diabetes are among the most common, costly and preventable of all health problems. 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 focus area seeks novel and innovative programs that may lead to improved outcomes and reduced system-wide costs for caring for this patient population in these areas.

We are interested in integrated approaches that account for a patient's risk for chronic conditions, such as diabetes, hypertension and heart disease and that could provide a personalized, cost-effective recommendation for treatment.

We are interested in solutions that will:

- Offer tools to enable connectivity within the care team to enhance compliance and improve overall outcomes
- Offer tools that empower patients to effectively self-manage their own chronic disease
- Address social aspects of chronic disease management
- Offer both clinical and non-clinical solutions

V. Transition of Care Optimization: We believe ensuring “warm handoffs” along the continuum of care will lead to better clinical outcomes, patient experience and ultimately lower healthcare costs. As patients move from one clinical center to another, there is currently a loss of information, guidance and interruptions in adherence to care guidelines. We seek proposals that provide better support to patients, caregivers, nurses and clinicians as patients move between sites of care and or different care organizations.

Operating Room Efficiency: Operating room services are highly complex entities within the health care environment. Each day hospital staff is required to orchestrate a highly multifarious sequence of efforts to provide complex care. We are seeking proposals that aim to improve operating room efficiency in the arenas of patient flow, communication, scheduling, equipment and instrument processing, operating room organizational structure, turn-over times and perioperative services. Proposals should center on specific and quantifiable challenges. Proposals that present the potential for extrapolation to other aspects of operative services are encouraged.

We are interested in solutions that will:

- Offer digital guidance and support for patients and caregivers
- Provide new incentives for clinicians to create warm handoffs
- Create technologies and analytics platforms to support patients and caregivers through transitions
- Match the right patient to the right care at the right time, place and cost

VI. Behavioral Economics: Presenting stakeholders with interventions that nudge them toward optimal decisions will benefit the healthcare system and enable us to achieve our objectives of improving care and lowering costs. We seek proposals that draw on the field of behavioral economics to frame choices for patients, caregivers and clinicians to improve adherence to guidelines and positively impact health.

We are interested in solutions that will:

- Incentivize clinicians to adhere to medical guidelines and standards
- Incentivize patients and caregivers to adhere to clinical recommendations
- Encourage wellness and prevention behaviors like diet and exercise

- Influence re-imbursement design
- Create decision support tools
- Accelerate adoption of new technologies

VII. 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. Proposals 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.

SUMMARY

If the desired end is simpler, more affordable and more accessible healthcare solutions, how can we begin with that end in mind? At DHTI, we see two prerequisites:

First, is to create strong partnerships across payers, providers and innovators. Making smart solutions widely accessible hinges on acceptance by payers and providers. Through DHTI, payers and providers are integral partners from the outset, identifying high-priority opportunities that can have far-reaching impacts on cost reduction and quality improvement. In the hands of world-class researchers, payer data can be utilized as part of technology development and translated into insights on market needs. The result? Exciting solutions are introduced to a ready-and-waiting marketplace.

Second, welcoming—even insisting on—fresh perspectives. Disruption generally does not come from expected sources. Indeed, we believe CMU’s lack of a medical school is advantageous. DHTI fosters partnerships between clinicians and diverse CMU disciplines in a wide range of basic and applied sciences, as well as information science, behavioral economics, engineering, entrepreneurship and human-centered design. We find that a mix of perspectives dramatically expands the variety and originality of promising solutions brought to the table.

Our aim is to spur successful—and sometimes surprising—solutions to pressing problems in healthcare delivery.

Our technical areas of interest and suggested proposal topics are:

- I. Pain and Addiction Management**
- II. Optimization of Drug Delivery**
- III. Medical Diagnostics**
- IV. Chronic Disease Management**
- V. Transition of Care**
- VI. Behavioral Economics**
- VII. Other**



TECHNICAL PROPOSAL TEMPLATE

SOLICITATION #4

Submit online at www.engineering.cmu.edu/dhti

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 8 pages) along with your completed budget form and quad chart.

1. **Project Title:**
2. **Spex #**
3. **CMU 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:
4. **Highmark/AHN Research Team:** List PI's (name, affiliation and email address) and anticipated involvement.
5. **External 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:
6. **Executive Summary (Abstract) of Project:** *(limit of 200 words; Executive Summary will be used for public dissemination if project is awarded)*
7. **Human Subjects:**

Will this project involve any activities with humans or their data?

 Yes
 No

Check all project characteristics that apply:

- Conducted at CMU
- Conducted at another location
- All or part of the work carried out by CMU faculty, staff or students
- All or part of the work carried out by non-CMU individuals
- Includes interaction or intervention with a living individual
- Includes review of data derived from humans (data that may or may not be personally identifiable)
- Uses a device, algorithm, system, software, etc. developed and/or modified at CMU

8. Intellectual Property

Does the research build upon any existing IP at either CMU and/or AHN? If yes, please identify by disclosure and/or patent/patent application #s.

Was this background invention developed in collaboration with any other 3rd parties (companies, universities, etc.) or as a part of a consortium? Please state yes or no. ____

Have you used any third-party resources in the creation of your technology (i.e. material or equipment from a company or university under a Material Transfer Agreement (MTA) or other formal or informal agreement)? Please state yes or no. ____

Have you used any software, libraries, etc. from other internal (e.g., CMU) sources (ex. projects or researchers) in the development of this technology or does the technology otherwise build upon earlier work at CMU? Please state yes or no. ____

Have you used any Open Source software in the development of this technology? Please state yes or no. ____

Do you know of any other inventions which are related to this invention? Please state yes or no ____

9. Please identify the technical focus area to which this proposal is directed:

- Pain and Addiction Management
- Optimization of Drug Delivery
- Medical Diagnostics
- Chronic disease management
- Transition of Care
- Behavioral Economics
- Other

PROPOSAL SUBMISSION

In 5-8 pages, the submission should convey the unmet clinical need, market potential, uniqueness and protectable nature of your research including path to market/clinical use.

The body of the proposal must include:

1. Summary of preliminary data.

- Current research progress that supports the proposed technology
- Information supporting the efficacy of the proposed technology

2. A description of the unmet clinical need.

- Number of patients affected
- Health care expenditures for treatment and/or diagnosis
- Future trend of the problem

3. The proposed solution and scope of work.

- The proposal must be as focused as possible on the development of an innovative technology and novel solution for the identified problem. We are focused on proposals with translational solutions as opposed to academic and those that add to the general body of knowledge.
- Comparison to standard of care and competitive marketplace. Discuss competing technologies if any.
- Include if and for how long your investigative team has worked together on the proposed solution.

4. Research and Development timeline.

- “Bench to bedside” time taking into consideration technology feasibility, proof of concept, product development, verification and validation, manufacturing and regulatory considerations.

5. Intellectual property status.

- Include invention disclosures, patent applications filed, shared IP ownership with others, patents awarded and/or technologies licensed, related to the proposed technology, including third party IP.
- DHTI is interested in proposals with unencumbered IP.

BUDGET INFORMATION AND RESTRICTIONS

- Period of Performance: June 30 – July 1
- No faculty salary allowed without pre-approval
- Indirect rate: 57.3%
- SPEX number required for submission
- Graduate student support: Use standard tuition/stipend rate for your department.
- Benefits rate: Please use current non-federal rate of 28.3%
- Sub-contracts: Provide budget, justification, Statement of Work, and contact info
- Budget cap: \$300,000
- Inflation rate: 3%
- No capital equipment without prior approval
- Budget Template: Download from www.engineering.cmu.edu/dhti

Questions:

For questions regarding DHTI, pre-Award and post-Award activities and requirements, and/or preparation of proposals, please contact:

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