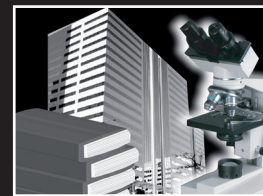


Institutional Profile



Center for Connected Health

The Center for Connected Health, a division of Partners HealthCare (MA, USA), is working to create a new model for healthcare delivery, by developing programs and innovative strategies to move care from the hospital or doctor's office into the day-to-day lives of patients. Our technology-enabled and patient-centric connected health initiatives are engaging patients, providers and the connected health community to improve quality and access to care. Many patients 'graduate' from these connect programs empowered and equipped to better manage their own health; and these programs are being successfully integrated across the Partners' network of hospitals and implemented by major employers. Our focus is to innovate, accelerate and operate connected health initiatives to transform healthcare delivery in an era plagued with a rising prevalence of chronic diseases.

Changing healthcare delivery

The Center for Connected Health (MA, USA) is leveraging information technology – cell phones, computers, networked devices and simple remote health monitoring tools – to help providers and patients manage chronic conditions, maintain health and wellness, improve adherence, engagement and clinical outcomes.

Established in 1995, the center's connected health initiatives are facilitating data-driven coaching and as-needed provider involvement to help achieve patient care goals. Technology-enabled programs in heart failure, hypertension, diabetes and other chronic conditions are being successfully integrated across the Partners network of hospitals, including Brigham and Women's and Massachusetts General Hospitals, and implemented by major employers.

The Center for Connected Health team is comprised of 40 clinicians, engineers, product managers, research and business analysts, whose focus is to innovate, accelerate and operate connected health initiatives to change healthcare delivery.

In 2010, Healthrageous, a health management company, was successfully launched based on the technology platform developed at the center. The company delivers digital, self-management prevention and chronic condition health solutions via the internet and a mobile app.

Consulting: harnessing technology to transform care

The center works with companies and organizations to help prepare their

products and services for integration into the healthcare delivery system. The center's team of clinicians, technologists and business strategists work to prove that the right technology, in the right patient's hands in the right setting, can have a profound effect on care and quality of life.

The center's consulting services include strategic, business and/or market development expertise, product evaluations and expert reviews. The center may convene patient and/or clinical endusers or experts to provide feedback and insights on a specific product or service. Consulting activities may include consumer and provider market research (surveys, focus groups and individual interviews) and deep-dive technical evaluations by the Technology Consulting Group (before/after studies and benchmark comparisons). The center also offers feasibility trials piloting a product and/or service in a real-world setting, possibly in patients' homes or a clinical settings. These trials may measure clinical outcomes, along with providing valuable learning relating to usability, reliability, identifying use cases, support requirements and workflow issues.

As consultants to medical device manufacturers, mobile health innovators and a range of technology, electronics and telecommunications companies, the center provides valuable opinions and real-world applications to help clients successfully integrate their offerings into the healthcare delivery system.

Research & development

At the heart of the center is its R&D capability. The goal of the research group is to

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identify technologies and trends that will move the provision of care out of traditional care settings. With this roadmap in mind, the center seeks funding to carry out studies and trials aimed at assessing the value that these technologies will bring to the next generation of connected health.

The R&D group does not focus on the development of novel technologies, but rather on how existing technologies can change the process of care. R&D activities often start where consulting services end with small-scale technical feasibility studies progressing to larger scale randomized controlled clinical trials.

Motivating behavior change to improve care & outcomes

Chronic disease management accounts for over 75% of all healthcare expenditures, yet it is well known that improved lifestyle choices can significantly reduce the risk of developing conditions such as hypertension, heart disease and diabetes. Thus, chronic disease management is a major priority for healthcare providers, patients and payers.

Patients regularly collecting and submitting their vital signs enable providers to more effectively assess the patient's status and provide just-in-time care. Personal health data also helps to educate and motivate patients to make necessary lifestyle changes. Evidence suggests that home monitoring can make a significant effect on patient care.

At the Center for Connected Health, a number of remote monitoring and personalized connected health programs are being implemented, to collect accurate physiologic patient data and allow providers to effectively review that data, while also engaging patients in their care.

Connected health programs

■ Connected Cardiac Care

"The Connected Cardiac Care program has changed the care for my heart failure patients for the better. With further connection to a heart failure prevention and treatment program, this promises to be cutting-edge, personalized care for our highest risk patients," said James Januzzi, MD, Director of the Cardiac Intensive Care Unit at Massachusetts General Hospital.

The Connected Cardiac Care program is a home monitoring and education

program for patients with heart failure (HF) who are at risk for hospitalization. HF patients are automatically enrolled in the program, and transmit their weight, heart rate, pulse and blood pressure to their telemonitoring nurse each day using simple home monitoring devices and a secure website. Telemonitoring nurses at Partners HealthCare At Home work with each patient providing daily support, education and care coordination. As a result, rehospitalization of HF patients enrolled in this program has decreased by 48%. The program continues to expand across the Partners HealthCare system.

■ Diabetes Connect & Blood Pressure connect

Similar remote monitoring programs for hypertension and diabetes are helping patients achieve positive behavior change to better manage their health.

Diabetes is a chronic illness that affects more than 20 million adults and children in the USA – and this number is growing rapidly. Diabetes Connect is showing that patients actively engaged in this program can better manage their condition to achieve better health outcomes.

Patients enrolled in Diabetes Connect monitor and upload their blood sugar levels and record observations and medication changes in an online journal. Providers access the patient's data and entries, and can send secure messages to the patient or change their treatment plan without having to wait for a scheduled appointment.

In a recent review of 75 diabetes patients enrolled in Diabetes Connect, a group of patients actively engaged (as measured by uploading their readings more than 15 times over a 12-month period) had an average drop in glycated hemoglobin of 1.5%. Engaged patients loaded batches of glucose readings every 10–20 days on average.

For patients with hypertension, Blood Pressure Connect enables patients and their providers to view blood pressure trends and facilitates improved communication and engagement. The program was launched following a successful study with more than 400 hypertensive or prehypertensive employees from a major Massachusetts employer. In this study, 85% of participating employees reported feeling more in control of their health, and 22.3% of



intervention subjects saw a 10 mmHg or greater drop in systolic blood pressure, compared with 16.7% of control subjects.

“Blood Pressure Connect makes my patients feel more involved in their care and have a stronger connection to me as their healthcare provider,” said Robert E Singer, MD, a primary care doctor at Massachusetts General Hospital. “Seeing their own blood pressure readings makes the condition real. As a result, my patients are making better lifestyle choices, are more willing to follow their recommended care plan and are more satisfied with their treatment.”

Message Connect

Message Connect is a text messaging-based technology platform that allows healthcare providers to send customized messages to patients. Texting programs have great potential for providing low-cost, accessible educational messaging to diverse patient populations.

For young, at-risk pregnant women being treated in an urban community north of Boston (MA, USA), a text messaging pilot program provided support, motivation and timely education throughout their pregnancy. Messages were customized to each patient, to encourage these women to get appropriate prenatal care. More than a half preferred to receive the text messages in Spanish.

A total of 84% of participants said the program helped them learn how to take care of themselves and their baby. By potentially increasing attendance at prenatal visits, text messaging can be an important tool to remind patients about the importance of regular care and contribute to improved health outcomes for pregnant adolescents and young adults and their newborns.

This program is now being expanded to other obstetrics and gynecology practices in the Partners network.

Similar text messaging programs have also helped to improve self-care behavior. A text messaging program nearly doubled the adherence of patients applying sunscreen; another program significantly improved treatment adherence, skin severity and quality of life for dermatology patients with atopic dermatitis; and 100% of patients enrolled in an opioid addiction treatment program felt better connected to their case managers.

Fitness & activity monitoring

Step It Up is a first-of-its-kind activity program that incorporates technology, educational feedback and a fun, team-oriented foot race to raise awareness about the importance of daily activity and good health.

Nearly 200 elementary school children at two inner-city Boston public schools received ‘sneaker chip’ pedometers and step-meters to track their individual steps. The mini wireless pedometers automatically upload step counts and minutes of activity to designated computers throughout the schools when students walk by. Many of the students increased their step count week after week, especially during weekends.

Another recent study conducted by the center demonstrated that the use of a ‘virtual coach’ or computer agent increases activity levels in overweight or obese individuals. Patients from Massachusetts General Hospital who were enrolled in the study showed a significant percentage change in step count for participants with access to internet-based coaching versus those without access to the virtual coach.

Expanding access to specialty care

For over 10 years, Partners Online Specialty Consultations (POSC) has provided thousands of patients and their healthcare providers virtual access to specialty care at Partners-affiliated hospitals. POSC is available to anyone with access to the internet, and innovative employers and insurance plans now offer POSC as a member benefit, providing their members with peace of mind and more options for their care.

A recent review of POSC consultations found that in only 5% of the cases, the specialist opinion was in complete agreement with patients’ originally recommended treatment plan. In more than a half of the cases, the consulting specialist recommended a complete change in treatment plan, suggesting profound implications for clinical care.

The center also supports live and interactive telemedicine, provides support to other clinical video conferencing programs such as the MGH Telestroke



program and the MGH Pediatric Critical Care program.

The Partners Collaborative Media division operates, within the center, conferencing and/or digital media needs, and manages more than 5000 video sessions, and more than 100 domestic and international clinical programs annually.

Connected Health Symposium

At the center, building awareness, asserting leadership and influencing public policy are all components influencing the adoption of new and transformative healthcare initiatives. As part of this objective, the center hosts the annual Connected Health Symposium which attracts more than 1200 professionals from around the globe. The Connected Health Symposium has become a respected destination event and thought leadership ‘ideas conference’, advancing the transformation of healthcare delivery.

Partners HealthCare has been developing ways to redesign patient care, care that is valuable to the patient at a cost that is appropriate. The center for Connected Health is playing a vital role in that effort. Using connected health strategies, the center is helping to integrate patient data, link patients at home to their providers, and improve efficiencies and clinical outcomes.

Financial & competing interests disclosure

The authors have no relevant affiliations or financial involvement with any organization or entity with a financial interest in or financial conflict with the subject matter or materials discussed in the manuscript. This includes employment, consultancies, honoraria, stock ownership or options, expert testimony, grants or patents received or pending, or royalties.

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Highlights

- The Center for Connected Health is working to change healthcare delivery by leveraging information technology to better engage patients and providers in the management of health, wellness and chronic illness.
- Feedback loops based on objective physiologic data enable patients to gain insights which lead to improved health. These data also enable providers to make just-in-time care interventions.
- Physical activity monitoring, along with educational feedback in our fitness programs is increasing patient awareness about the benefits of daily activity and healthy living, helping to decrease the impact of chronic diseases.