



PARTNERS[®]
HEALTHCARE

CENTER FOR
CONNECTED HEALTH

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HEALTHCARE

FOUNDED BY BRIGHAM AND WOMEN'S HOSPITAL
AND MASSACHUSETTS GENERAL HOSPITAL



48%

reduction in re-hospitalizations for patients enrolled in Connected Cardiac Care

Connected Cardiac Care: A Better Lifestyle Can Lead to Better Outcomes

Connected Cardiac Care carefully monitors our heart failure patients at home, and helps them better understand how their lifestyle choices affect their health.

Heart failure patients in the Partners HealthCare network needing the most care are automatically enrolled in the program. These patients transmit weight, heart rate, pulse, and blood pressure to their tele-monitoring nurse each day. By combining tele-monitoring, coaching and education, Connected Cardiac Care promotes greater patient engagement, just-in-time education and nursing interventions to improve care and reduce hospital readmissions.

Patients have indicated a high level of satisfaction with the program. Nearly all reported that the equipment was simple to use, and that they felt more in control of their health.

“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/treatment program, this promises to be cutting-edge, personalized care for our highest risk patients.”

James Januzzi, MD

Director, Cardiac Intensive Care Unit, Massachusetts General Hospital

Blood Pressure Connect

For patients with high blood pressure, a chronic condition that is largely non-symptomatic, maintaining the necessary diet and exercise regimens and care plan for the long-term presents an opportunity for connected health. Blood Pressure Connect, a home monitoring program, enables patients and providers to view blood pressure trends and facilitates improved communication and engagement. Currently offered at several primary care practices throughout the Partners HealthCare network, the program allows providers to more accurately assess the health of their patients and proactively manage their treatment.

Blood Pressure Connect was launched following a successful study conducted at EMC Corporation. In the study, 85% of the more than 400 EMC employees enrolled reported feeling more in control of their health. And the clinical results were promising. 22.3% of intervention subjects saw a 10mmHg or greater drop in systolic blood pressure, compared to 16.7% of control subjects.

A variation of this program was offered to select Partners HealthCare employees in 2009 and 2010. Based on this technology, Healthrageous, a personalized health technology company, launched in the

spring of 2010, and is offering a range of health and wellness self-management programs to their clients.





Staying Young and Healthy at Home

“My blood pressure is the best it’s been in 40 years,” said 81-year-old George Ruboy (above), an active and energetic lawyer, husband, father and grandfather. “Nothing makes you feel over the hill more than being in and out of the hospital.”

George had been hospitalized six times in one year due to heart failure and, at home, needed oxygen every night to help him sleep. Since participating in the Connected Cardiac Care program, George’s health has improved dramatically, he has an active work and social schedule and no longer needs oxygen to help him breathe. “I’m a whole person again,” he added. Showing no signs of slowing down, George splits his time between his home in Norwood, MA,

and Cape Cod. He has not required re-hospitalization since starting the program.

“This program gave me a great sense of support and comfort. It taught me discipline to watch my weight and my blood pressure, and to make changes before I end up back in the hospital,” said George. “It also helped having a nurse to answer to every day, even though my wife and kids watch over me like hawks.”

“The equipment is easy to use and it’s a very caring, thorough operation,” he added. “I’d definitely recommend it to others.”



Making A Medical Condition Real – And Easier for Patients to Manage

“In medical school, we are taught how to diagnose and treat medical problems. We are not taught about how patients will react to the news that they have a health condition that needs attention,” said Robert E. Singer, MD (above left), a physician at Mass General’s Everett Family Care. “Many patients, when diagnosed with high blood pressure, don’t believe the diagnosis, insist there is a simple explanation or don’t think they need treatment.”

Dr. Singer believes that the real-time, personal health information patients receive as part of Blood Pressure Connect, a home monitoring program, makes their condition and the need for treatment harder for them to ignore.

“The program is a gem,” said Donna Leone, RN (above right). “Dr. Singer’s patients are very pleased with this program and the incredible level of support they receive. Our patients don’t have to travel in to the office to have their blood pressure monitored, and the equipment is easy to use.”

“Blood Pressure Connect makes my patients feel more involved in their care and have a stronger connection to me as their healthcare provider,” added Dr. Singer. “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 plans and are more satisfied with their treatment.”

About The Center

The Center for Connected Health 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. Leveraging information technology—cell phones, computers, networked devices and simple remote health monitoring tools—the Center is helping providers and patients manage chronic conditions, maintain health and wellness, and improve adherence, engagement and clinical outcomes.

By collecting and presenting accurate physiologic and behavioral data to both patients and providers, our connected

health initiatives are facilitating data-driven coaching and as-needed provider involvement to help achieve patient care goals. Our technology-enabled programs in heart failure, hypertension, diabetes and other chronic conditions are being successfully integrated across the Partners HealthCare network and implemented by major employers.

The Center also offers expert online second opinions, enhanced medical education and training, and engages in innovative research to discover new pathways to better care.

Established in 1995, the Center for Connected Health is a division of Partners HealthCare in Boston, founded by Brigham and Women's and Massachusetts General Hospitals.



Connected Health Symposium: Mapping the Way Forward

Each fall, over 1,000 health technology entrepreneurs, hospital administrators, healthcare providers, health plan executives, large employers, government policy-makers, academic researchers and investors gather in Boston at the annual Connected Health Symposium hosted by the Center.

Notable presentations from healthcare and technology luminaries provide perspective, vision and inspiration. Speakers have included Nicholas Christakis, MD, PhD, MPH, one of *Time Magazine's* Most Influential People in the World, Massachusetts Senator John Kerry, BJ Fogg, PhD, Stanford University, Gary Gottlieb, MD, Partners HealthCare, Angie Hicks, founder, Angie's List, Cass Sunstein, Harvard Law School, and Dena Puskin, ScD, US Health and Human Services. Topics range from innovation in wireless consumer health, personal robotics, and digestible, implantable and wireless band-aids, to technologies for people with disabilities, social networks and reimbursement policies.

Innovative thinking, compelling discussion and lively networking opportunities are the hallmarks of the Connected Health Symposium.

We are creating
a new model of
care delivery, to
better integrate
quality care into
the day-to-day
lives of our
patients.

Partners Collaborative Media Services

To better facilitate teaching and learning for clinicians and patients worldwide, our Collaborative Media Services team offers enhanced videoconferencing, as well as streaming and other digital media.

One of the programs supported by the group is Connected Pediatric Critical Care. This program enables on call pediatric intensive care unit (PICU) physicians at Massachusetts General Hospital *for* Children to remotely examine a patient and directly communicate with the on-site staff, using videoconferencing units from their homes. A portable telemedicine station positioned at the patient's bedside allows the attending physician to personally evaluate the young patient using special cameras and scopes, and to communicate directly with the PICU staff, other specialists and even the child's parents.

The digital media group also delivers streaming media educational content via an advanced Learning Management System (LMS), allowing for the presentation of on-demand lectures through a customized website, with supporting quizzes and documentation.

In 2010, Partners Collaborative Media teamed up with the Global Psychiatry Division at Massachusetts General Hospital, Harvard Medical School faculty and the non-profit Palestinian Medical Education Initiative in a pilot program to facilitate video-based training sessions with mental health practitioners in Gaza. In Gaza, a region in active conflict, there is a high incidence of post traumatic stress disorder, depression, anxiety and other mental health challenges.

Partners Collaborative Media Services is leveraging its unique assets and technology platform to support these innovative programs in clinical care and medical education.



POSC Coordinators, Kathy Fiamma (left) and Cyrilla Etienne-Griffin (right), with POSC consulting physician Nicté Mejía-González, MD (middle), Assistant in Neurology, Movement Disorders Unit and General Neurology Unit, Massachusetts General Hospital

Confidence and Caring via Online Second Opinions

The Partners Online Specialty Consultation service (POSC) electronically connects patients with life-threatening or unusual diagnoses, and their local providers from around the world, with physicians at Massachusetts General Hospital, Brigham and Women's Hospital and Dana-Farber/Brigham and Women's Cancer Center, when seeking an expert second opinion on a challenging diagnosis or treatment plan. Forward-thinking employers, insurers and benefits management companies also offer POSC as a benefit to its members.

Specialists in areas including oncology, cardiology, neurology and nephrology review patient records, test results, radiology and pathology to help determine an accurate diagnosis or the most effective course of treatment.

"This program works really well and, as a consulting physician, we have all of the information available to quickly make an informed recommendation," said Arnold S. Freedman, MD, Associate Professor of Medicine, Harvard Medical School, and Clinical Director of the Lymphoma Program at Dana-Farber Cancer Institute. "We are able to add to every case."

When diagnosed with non-hodgkins lymphoma, a businesswoman and expatriate living in Asia turned to POSC for help to determine the most effective treatment plan. Dr. Freedman was the consulting physician on the case.

"My physician is head of hematology at a major hospital in Asia. He had previously met Dr. Freedman and was delighted to have the opportunity to collaborate with him," she said. Within just two days, the patient and her physician received a comprehensive report and treatment recommendations. "The completeness of the report, and the experience of Dr. Freedman and the Cancer Center, gave us great confidence that we were making the right decisions," she added.

"About one-third of my office visits are for patients seeking a confirmatory consultation and many of these patients travel a great distance, just to have another set of eyes confirm that they have the right diagnosis and are on the right treatment track," added Dr. Freedman. "In the future, it would be much more efficient to use this online second opinion system to provide these confirmatory consultations for all patients."



Reminders and Incentives Improve Adherence

The World Health Organization estimates that only 50% of patients with chronic diseases take their medication as prescribed. Numerous studies demonstrate that poor adherence reduces the effectiveness of medications, jeopardizes patient health and increases healthcare costs.

A study recently completed at the Center for Connected Health found that patients with high blood pressure, who received reminders to take their medication via a wireless electronic pill bottle, were more adherent to their medication plan than the control group. Specifically, patients receiving audio and visual reminders achieved an adherence rate of almost 99%, compared to 71% for the control group.

This randomized controlled study assessed the impact of GlowCaps™ developed by Vitality, Inc. GlowCaps™ fit popular, standard pill bottles and signal patients with light and sound when it is time to take the medication inside. An embedded wireless connection enables the device to send automated calls for any missed dose, weekly progress reports and refill reminders. The system also shares adherence information with physicians and a social network if the patient chooses.

Diabetes Connect: Connecting Patients and Providers

For patients with diabetes, medication, diet and exercise are important aspects of their disease management. But for many, these are difficult lifestyle adjustments to make, and maintain, on their own.

“You go to the doctor for help and, I have to say, this program is what I consider to be a big help for me. It keeps me aware of what I’m doing and gives me a better frame of mind about my condition,” said Leo Jabotte, 66 (below), retired from a major golf ball manufacturer.

Through Diabetes Connect, Leo and his nurse educator at Hawthorn Medical Associates in North Dartmouth, Massachusetts, were able to adjust his insulin without frequent visits to the doctor’s office. “As soon as something gets out of whack, my nurse is on the phone. She and my doctor are up-to-date on my condition and I don’t have to go back and forth to the doctor’s office. Saves me time and money and keeps me from cheating on my diet.”

Patients with diabetes monitor and upload their blood sugar levels and record observations and medication changes in an online journal. Providers can access the patient’s data and entries, and can send secure messages to the patient or change their treatment plan without waiting for a scheduled appointment.

An evaluation of the program at an active practice showed that patients who uploaded their glucometer data had a mean HbA1c reduction of 1.4 percentage points, from an average of 9.6 to 8.2, within a 9 month period.

Michael T. Myers, Jr., MD, MBA, Medical Director, Hawthorn Medical Associates, observed, “I see Diabetes Connect as a very elegant biofeedback loop of information, to help patients better understand their disease processes, symptoms and warning signs, and how medication and other lifestyle choices can affect clinical outcomes and quality of life.”



Text Messaging Prompts and Informs

In two recent studies, patients responded very favorably to receiving reminders and information via their cell phones.

Study participants receiving text message reminders on their cell phones were nearly twice as adherent to applying sunscreen compared with those who did not receive reminders.

Daily text messages providing medication reminders and information about atopic dermatitis (a type of eczema) significantly improved treatment adherence, self-care behaviors, skin severity and quality of life for dermatology patients. This was the first study to combine medication reminders with educational information, which led to critical improvements in self-care behavior.

These data indicate that simple text messaging may have important implications for larger-scale public health initiatives.



Mobile Messaging Supports Diverse Patient Populations

The Center has begun exploring applications for reaching a broader population of patients by leveraging the technology that is already part of their lives—cell phones and text messaging.

In the urban setting of the Lynn Community Health Center, two messaging pilots have offered patients support, motivation and timely education when they needed it most. One pilot targeted young, at-risk pregnant women and teens, and the other targeted patients enrolled in an opioid addiction treatment program.

Supported in part by Partners Community Benefits and the Verizon Foundation, these programs aimed to keep patients connected with their care team and to provide bite-sized, timely messages of support created in collaboration with their providers.

Patients were overwhelmingly positive about the pilot and plans are in the works to examine ways to expand the programs. Over 90% said they would recommend the program to other patients in their situation.

84%

of at-risk pregnant women said the program helped them learn to take care of themselves and their baby

100%

of patients in the treatment program said the text messages made them feel supported by their case manager

“(I liked) the inspirational notes as a reminder to take it ‘one day at a time’ (and) ‘hope you are doing well’. During my hectic days it helps me to pause and remember I’m on the right path. Always puts a smile on my face.”

Text messaging pilot participant

Selected Recent Publications

Pena-Robichaux V, Kvedar JC, Watson AJ. **Text Messages as a Reminder Aid and Educational Tool in Adults and Adolescents with Atopic Dermatitis: A Pilot Study.** *Dermatology Research and Practice.* 2010 (2010), Article ID 894258.

Watson AJ, Bergman H, Williams CM, Kvedar JC. **A Randomized Trial to Evaluate the Efficacy of Online Follow-up Visits in the Management of Acne.** *Archives of Dermatology.* 2010;146(4):406-411.

Watson AJ, Kvedar JC, Rahman B, Pelletier AC, Salber G, Grant RW. **Diabetes Connected Health: A Pilot Study of a Patient and Provider-Shared Glucose Monitoring Web Application.** *Journal of Diabetes Science and Technology.* 2009; 3(2): 345-352.

Armstrong AW, Watson AJ, Makredes M, Frangos JE, Kimball AB, Kvedar JC. **Text-Message Reminders to Improve Sunscreen Use: A Randomized, Controlled Trial Using Electronic Monitoring.** *Archives of Dermatology.* 2009;145(11):1230-1236.

Kulsgreshtha A, Nieves R, Kvedar J, Watson A. **Using Information Technology to Improve Outcomes in Patients with Heart Failure: The Value of Remote Monitoring.** *Circulation.* 2008;117(21):e414.

“From Texting To Apps, Using Cell Phones For Health”

Associated Press, July 13, 2010

“Video program puts docs at bedside 24/7 at MassGeneral”

Healthcare IT News, February 3, 2010

“Connected health offerings aim to shake up health-care industry”

Mass High Tech, April 28, 2010

“Acne patients fare well in virtual office visits”

The Boston Globe, April 26, 2010

“Text Messages May Be Way to Improve Eczema Management”

The Wall Street Journal, September 28, 2010

“Remote diabetes testing could curb medical, drug costs”

Employee Benefit News, March 24, 2009

“Online services let patients seek a second opinion from home”

USA TODAY, June 20, 2008

“The Doctor Will E-Mail You Now”

Newsweek, December 11, 2008

“Connected Health, Connected Reform”

Science Progress, July 17, 2009



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