CENTER FOR PATIENT SAFETY RESEARCH AND PRACTICE

TRANSFORMING PATIENT CARE

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Center Updates: a seasonal review

Spotlight: Michael Sheehan

On the morning after the Boston Marathon bombings this past April, Michael Sheehan, Company Chairman of Hill Holliday marketing agency, got an important phone call. On the other end was James Gallagher, Executive Vice President of John Hancock, who had called to enlist Sheehan's help. Gallagher informed Sheehan that he had received a significant request directly from Boston's Mayor Thomas Menino and Massachusetts Governor Deval Patrick. The two statesmen were determined to develop an organization to aid those affected by the terror attack. Sheehan immediately put his digital team to work, and that same day Hill Holliday created The One Fund Boston program. Since it was founded, The One Fund Boston has raised over $60 million from local organizations connected to Sheehan and his company, including a $1 million donation from Partners HealthCare, to benefit Marathon victims and their families.

Mr. Sheehan's network across Boston area communities includes an important relationship with Partners HealthCare. He currently serves as a member on the Executive Council of the Center for Patient Safety Research and Practice. Aside from his work within the community, Sheehan holds an impressive list of professional accomplishments at Hill Holliday. Beginning as a copywriter and creative director, his inventiveness has earned him nearly

(Continued on page 2)

David Bates, MD, MSc and Patricia C. Dykes, RN, PhD Receive Award to Evaluate Efficacy of EverOn Monitoring Systems

For over a decade, the Institute of Medicine has reported that errors occur far too often in hospitals. Error is especially concerning in the acute care setting, where the environment is complex, dynamic and fast paced. Communication failures, inadequate information at the bedside, and associated delays in care delivery commonly contribute to adverse events. The most troubling adverse event related to delays in care is failure to rescue, where unexpected but preventable circumstances result in a patient's death while hospitalized. Even if death does not occur, delays in intervention related to clinical decompensation can create worse outcomes for patients. While Rapid Response Teams can promote sooner intervention for deteriorating patients, they need adequate health information technology (HIT) to deploy early enough to be effective.

EarlySense LTD recruited Dr. David W. Bates and Dr. Patricia C. Dykes to evaluate the efficacy of their EverOn monitoring system. The EverOn system may enable early recognition of clinical changes, identifying adverse events that support sooner interventions and greater prevention of patient deterioration. The non-invasive EverOn system uses a sensor placed underneath the patient's mattress to continuously and accurately monitor respiratory rate, heart rate and movement. EverOn displays this data at both the bedside and the central nursing station, alerting the medical staff when values fall out of range. The collected information from this continuous monitoring creates viewable patient trends, providing an additional level of analysis for detecting and responding to pattern changes.

The EverOn system's capacity to successfully identify and instigate early decompensation intervention depends on timely responses to the system's alerts by the clinical team on the hospital floor. The team aims to evaluate the effectiveness of the EverOn system, as well as how it will be utilized in the hospital, by first describing the type and percentage of early warning signs it detects. They then plan to determine the amount of time it takes to both communicate a patient status change and mount an appropriate intervention after the system detects

(Continued on page 8)

Special points of interest:

- **Dr. David Bates and Dr. Patricia Dykes to evaluate the efficacy of EverOn monitoring systems**
- **Modernizing Healthcare: Negotiating efficient protocols for facilitating innovation**
- **12 selected recent publications from Center members**
- **Center Global Fellows Corner with Katharina Steininger, PhD**

Inside this issue:

Schnipper receives PCORI Award	2
Hill-Holliday hosts CPRSP fall Executive Council meeting	3
Overview of EarlySense system	4
A focus on EarlySense and Med/Surg Patient Safety	5
Center Global Fellows Corner	6
Recent Publications	7

Jeffrey Schnipper Receives PCORI Award

An estimated 20% of all hospitalized patients suffer an adverse health event within 30 days of discharge. Approximately two-thirds of these events may be entirely preventable or ameliorable had care been better.

Brigham and Women's Hospital (BWH) received a $1.9 million award from the Patient-Centered Outcomes Research Institute (PCORI) toward improving and reshaping patient care transitions. BWH has titled this project, "Relative benefits of hospital-Patient-Centered Medical Home (PCMH) collaboration within an Accountable Care Organizations (ACO) to improve care transitions." Led by Jeffrey Schnipper, MD, MPH, FHM, Director of Clinical Research BWH Hospitalist Service, Division of General Internal Medicine, the study will evaluate a multi-faceted, multidisciplinary transitions intervention with contributions from hospital and primary care personnel across several PCMHs within the Partners HealthCare Pioneer ACO. The goal is to create a safe transition from the hospital to home that helps patients make a full recovery from their illness as quickly as possible.

The project is part of a portfolio of patient-centered comparative clinical effectiveness research. Several studies have shown that an estimated 20% of all hospitalized patients suffer an adverse health event within 30 days of discharge. Approximately two-thirds of these events may be entirely preventable or ameliorable (i.e. reduced in severity or duration) had care been better.

Recent healthcare reforms have been conducted to improve care and reduce costs. One such reform is the development of ACOs, large medical organizations that have made it their responsibility to lower expenses and enhance treatment for a defined group of patients. Another change is the conversion of regular primary care practices into PCMHs, which utilize more staff and superior technology to improve patient-doctor communication and better manage chronic illnesses.

In theory, PCMHs and hospitals within the ACO have great potential to augment the discharge process, ensuring that patients make more stable recoveries and are readmitted to the hospital less frequently. The study carried out by Dr. Schnipper and his research team aims to redesign the discharge process, promoting better communication between the hospital's medical team, patients, caregivers, and outpatient medical team. Greater communication between these disciplines will better guarantee that patients' conditions do not regress after they return home. This redesign will require nurses to help coordinate care, pharmacists to make sure medications are taken safely, visiting nurses to consult patients at home, follow-up appointments within three days of discharge, and healthcare "coaches" to motivate discharged patients.

This study will involve approximately 1,800 patients admitted to BWH and Massachusetts General Hospital from 50 primary care practices that are becoming PCMHs as a part of a new ACO. The researchers aim to understand the best way to implement the reformed system into different hospitals and practices, and which patients will benefit most from it. Their findings will help healthcare leaders determine how to adapt and introduce these new medical practices so that patients and caregivers will be more willing to use them.

Spotlight, continued

(Continued from page 1)

every national and international award for excellence in his field, such as The Grand Clio, One Show Gold, Cannes Lion, and the Communication Arts Award. He has held the titles of President and CEO of Hill Holliday, and on May 13 was named Company Chairman.

An article in the Boston Globe this past May praised Sheehan's dedication to the organizations that he serves. At work, he is steadfast and fully committed to his clientele. He drinks Dunkin Donuts coffee every morning, has multiple accounts at Bank of America, home and auto insurance from Liberty Mutual, and a life insurance policy at John Hancock. It is refreshing, then, to know that he displays the same loyalty to the Center as he does to his business associates.

http://adage.com/article/news/hill-holliday-creates-bombing-victim-relief-fund-fund/240989/
https://secure.onefundboston.org/
http://www.partners.org/About/Media-Center/Articles/One-Fund-Boston-Contribution.aspx
http://www.bostonglobe.com/business/2013/05/11/mike-sheehan-leaves-his-mark-hill-holliday/AkyNnGD7PtXkv720QsKoPO/story.html

CENTER Fall Executive Council Meeting

On Oct. 3, the offices of Hill Holliday hosted an Executive Council Meeting for the Center for Patient Safety Research and Practice. The purpose of the meeting was to discuss modernizing healthcare and to negotiate the most efficient protocols for collaborating and facilitating innovation toward the utmost excellence in care. In attendance were patient safety scientists and investigators from academia, government, industry and healthcare.

Brian Lawrence, PhD, Senior Vice President and Chief Technology Officer of Hill-Rom, was introduced and welcomed as the Center's newest member. Dr. Lawrence is an accomplished technologist with forty United States issued patents, twenty-four peer-reviewed articles, and over forty presentations to his name.

After the introductions period came a series of presentations about the work Partners HealthCare is doing to improve operations. The first two presentations, which focused on the measures being taken by Partners member hospitals to facilitate innovation, impressed the Council. Speaker Lesley Solomon, MBA, Director of Strategy and Innovation at Brigham and Women's Hospital (BWH), updated the Executive Council on the innovation hub, or iHub, characterizing it as "A home for innovation meant to accelerate change in the process of care delivery and translation of innovation and discoveries to clinical care." She also informed the assembly about the recent Hackathon, which took place between Sept. 20 and 22, and brought web developers, graphics designers, clinicians, and researchers together to collaborate on technological solutions to identified problems.

Christiana A. Iyasere, MD, MBA led the second presentation on Partners hospitals' innovation strategies. Dr. Iyasere explained to the Council her work as Associate Director of the Innovation Support Center at Massachusetts General Hospital. She emphasized the role of clinicians as "lead users." She also highlighted the Support Center's efforts to accelerate the implementation of their ideas, addressing well-defined problems.

After all the presenters from Partners had spoken, the Council heard from David Feygin, PhD, Vice President of Corporate Strategic Innovation for Becton Dickinson. Dr. Feygin spoke about the challenges that large, successful healthcare companies currently face. CEO of EarlySense, Avner Halpern, providing an intuitive contrast, presented on the innovations that have been made at much smaller healthcare companies. Mr. Halpern raised the important notion that timing is everything when it comes to innovation. He explained that one of the hardest parts of his job is deciding when he must say "No" to an unmistakably great idea. The insight offered by these industry experts stressed that even the most innovative ideas will not be well received without correct marketing and timing.

Throughout the day, presentations and discussions accentuated cooperation between clinicians and industry specialists who were committed to transforming their ideas into solutions that could be realistically adopted. Innovation happens when individuals from these two groups come together. While some of these collaborations have already appeared within the Partners system, experts at the meeting advised how these relationships could be refined if early focus is placed on issues of intellectual property and feedback loops, as well as on prioritizing sensible ideas for development. A subsequent discussion expressed the importance of patient engagement, not only for patient safety, but as a focal point for practical innovation.

The world is full of people with ideas. Leaders at Partners HealthCare, BWH and the Center are extracting real solutions from these ideas, solutions that will make a difference. Committing to the innovation strategies conceived by the Executive Council promises an auspicious future for BWH. The organization will only become more thorough, more efficient, and more exceptional.

"BWH iHub is a home for innovation meant to accelerate change in the process of care delivery and translation of innovation and discoveries to clinical care."

Lesley Solomon, MBA

BWH Director of Strategy and Innovation

Overview of the EarlySense Monitoring System

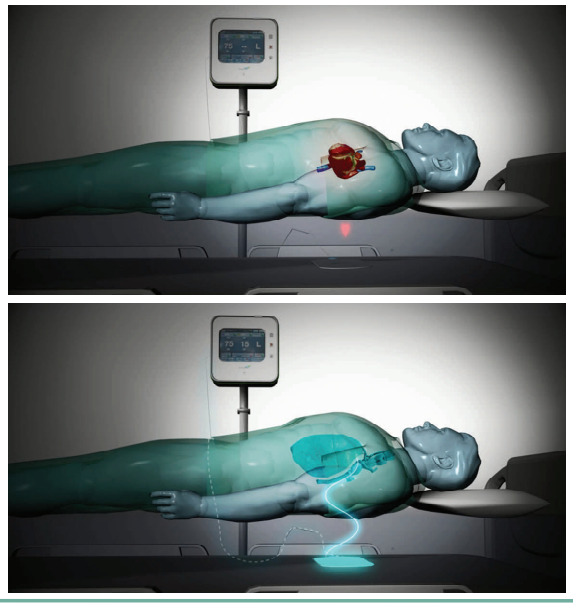
The EarlySense System Components

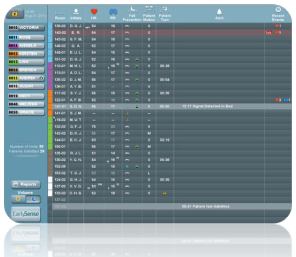
1. Under-the-mattress contact-free sensor
2. Wall-mounted bedside monitor
3. Central Display Station
4. Immediate, real-time alerts on mobile devices
5. Vital signs trends, alerts & documentation
6. Daily reports: patient status & alerts

EarlySense Bedside Unit Interface

How Does It Work?

1. The sensor detects all types of motion through the mattress.
2. The system processes the signal and applies algorithms to extract:
   - Heart Rate
   - Respiration Rate
   - Specific types of motion (turns and bed exits)





EarlySense Central Display Interface

Newton-Wellesley Hospital Presents: "A Focus on Medical/ Surgical Patient Safety: Early Detection of Deterioration"

On Dec. 12, Newton-Wellesley Hospital (NWH) hosted the event, "A Focus on Medical/Surgical Patient Safety: Early Detection of Deterioration." The all-day conference introduced NWH nursing staff to the newly upgraded patient monitoring system from EarlySense, an Israeli company with it's American headquarters in Waltham, MA. The meeting was directed by Perry An, MD; Patricia Dykes, RN, PhD; and Jean M. Roberson, RN; with help from EarlySense faculty members, Todd Barnett and Courtney Obecny.

The purpose of this "kickoff event" was to partner the nursing staff (the people who will be using these new devices) with EarlySense faculty to ensure that the EarlySense system will meet end users' specifications and its implementation will be widely accepted. The conference provided participants with a hands-on and feedback-oriented training program, meant to familiarize participants with the upgraded system and its benefits over traditional monitoring systems. It began with an overview of early detection strategies, emphasizing that many patients exhibit early warning signs prior to a critical health event (e.g. cardiac arrest), sometimes 6 to 8 hours in advance. Early detection methods can help members of a medical staff recognize and respond to these early warning signs, preventing these critical health events.

The early detection overview was followed by a presentation about recent upgrades to the EarlySense system, how it works, and how beneficial it can be when utilized. EarlySense provides the tools needed for nurses and other medical staff to identify potential early warning signs and trends that suggest deterioration, supporting intervention earlier in the patient's slope of decline and improve patient outcomes. A series of real NWH cases demonstrated the value of EarlySense as an early detection strategy in lives saved. In these cases the EarlySense Solution—Detect Early, Communicate Immediately, and Manage Effectively—enabled medical and nursing staff to step in and prevent or resolve declining patient conditions.

Next, the conference included break-out sessions based on participants' nursing units. Each group cycled between four stations, where they became personally acquainted with the newer advanced features of the EarlySense system and expressed what will best incentivize them to use it. Station 1 offered hands-on training with the EarlySense bedside device. Station 2 gave participants hands-on lessons on how to use the EarlySense Central Monitor and how to gather and read trends reports. At Station 3, groups discussed how they are currently using the EarlySense system and why they believe some features are used more than others. Station 4, also discussion-oriented, allowed each group to talk about the barriers that hinder the device's integration into clinical workflow and brainstorm ways in which to overcome them.

Based on each group's findings, participants came up with strategies for assimilating the EarlySense system into routine clinical practice. The goal here was to uncover how to improve the EarlySense device in order to streamline implementation. Listing and prioritizing features of the device ultimately determined which features would be used and which would be modified or removed from the final implemented product.

Participants were then asked to develop best practices for implementation of the EarlySense devices. The aim was to come to a consensus on the best implementation plan. Participants proposed unit-based goals that they will work to achieve during implementation. Groups collectively agreed they must reduce their alarm response times. They also deemed utilizing the EarlySense Trends feature as essential and studying and reporting on trends often. That way they can grow to steadily recognize patterns and adapt their approach to caring for each patient's unique condition.

All units identified champions, accountable for relaying the benefits of the EarlySense system, training other staff members, and ensuring smooth workflow while completing each day's duties. Unit champions will hold regular staff meetings to check on each unit's progress. They will then convene with EarlySense faculty, updating them on their progress (successes and drawbacks). This will allow EarlySense faculty to track the implementation process and offer assistance whenever needed. Through this approach, implementation becomes much more team-oriented, and all levels can reach their goals together.

At conference dismissal, participants voiced satisfaction with how the day's events unfolded. Addressing everyone's needs firsthand greatly increased their confidence in the EarlySense system and its successful integration. Once NWH has been successfully implemented, EarlySense faculty can use what they have learned to successfully integrate the system into other hospitals. The future looks bright for EarlySense and the opportunities it will generate toward improving patient safety.

The EarlySense Solution – Detect Early, Communicate Immediately, and Manage Effectively

Center Global Fellows Corner, Katharina Steininger

In this section, we will share the story of one of the Center's Global Fellows – what brought them here, what they learned, and what their take away will be.

It is unfortunate that so few make a living out of pursuing their passions. Thankfully Dr. Katharina Steininger, a pioneer in the rising Health Information Technology (HIT) profession, proves that dream jobs exist. Working toward implementing progressive healthcare initiatives in her native Austria, Dr. Steininger's discoveries in the Center's Global Fellows Program at Brigham and Women's Hospital (BWH) may be the key to successfully advancing the world's healthcare systems.

Dr. Steininger received her PhD in Business Informatics from Johannes Kepler University. Then, a major project proposed by Austrian delegates, its goal to develop a Centralized HealthCare System influenced her to narrow her focus to the specialized field of HIT. Despite the benefits of the Centralized HealthCare System, the project has met a lot of resistance. The task of uploading every citizen's information into this system, for instance, is unimaginably arduous. "A large amount of worry has met this [undertaking]," explains Steininger, "as many are concerned that because there is so much data to collect and record, the risk of mistakes being made to any of it is vast; and even the tiniest error could prove fatal."

Determined to prove that the gains of the system far outweigh the risks, Dr. Steininger got involved. She decided traditional Austrian implementation methods were not suited to quell the resistance. "In Austria," she reveals, "we have very little say in matters like these. We are not really able to provide any of our own feedback because we have representatives who are meant to speak for us." Steininger worried that Austria's impersonal approaches would not properly address the end users' needs, and the system would fail. She came to Boston seeking an alternative method that would lead Austrians to embrace the Centralized HealthCare System.

Dr. Steininger enrolled in the Center's Global Fellows Program after extensive research into United States health initiatives and which of those initiatives best applied to her and her goals. "I knew this would not only be the best place academically and intellectually," she explains, "but also where I would be most supported personally and professionally."

Prompted by how democratically the United States approaches new healthcare initiatives, Dr. Steininger spent her six-month fellowship developing an incentive approach to implementing an accepted Centralized HealthCare System. Because incentive approaches place value on direct feedback from end users, she believed that adapting Austrian models to best adhere to those users' needs would be an ideal method for promoting HIT adoption.

Steininger and her inter-professional team of BWH colleagues received IRB approval and began working to uncover the causes of resistance to the new system, and what can be done on an operational level to convince her people to utilize it. They attended and contributed to several committees, interviewed experts about various approaches, and based on those findings experimented with their own approaches.

Acknowledging the many valuable aspects of her time as a Global Fellow, Steininger says emphatically, "I am amazed by all the contacts I have made through the Brigham. I worked with many academic minds, political figures, and people in HIT to discover the key messages for how to make this work. I was honored to interview people I knew from medical publications I had read, and realize they actually cared about me and the success of my goals."

Using their collected information, Steininger and her team created and analyzed seven domains, designed to offer comparisons of different factors that trigger events in health systems, for example the rise in adoption rates. Dr. Steininger has since brought her incentive approach home to Austria, using it to persuade Austrian government officials to join her cause. With government support, she predicts the advancement of Austria's healthcare system will be more welcomed. She expects all of her results to be collected by early 2014. Then she will build and present her finalized implementation plan. If she succeeds, Austria will raise the standard for what is considered the modern healthcare system.

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Selected Publications by members of the Center

Diagnosis and diagnostic errors: time for a new paradigm. Schiff GD. BMJ Qual Saf. 2014 Jan; 23(1):1-3.

Causes and patterns of readmissions in patients with common comorbidities: retrospective cohort study. Donzé J, Lipsitz S, Bates DW, Schnipper JL. BMJ. 2013 Dec 16; 347:f7171. doi: 10.11/bmj.f7171.

Continuous monitoring in an inpatient medical-surgical unit: a controlled clinical trial. Brown H, Terrence J, Vasquez P, Bates DW, Zimlichman E. Am J Med. 2013 Dec 13. pii: S0002-9343(13)01072-3. doi: 10.1016/j.amjmed.2013.12.004.

Health care associated infections: a meta-analysis of costs and financial impact on the US health care system. Zimlichman E, Henderson D, Tamir O, Franz C, Song P, Yamin CK, Keohane C, Denham CR, Bates DW. JAMA Intern med. 2013 Dec; 173(22):2039-46. doi: 10.1001/jamainternmed.2013.9763.

Qualitative analysis of round-table discussions on the business case and procurement challenges for hospital electronic prescribing systems. Cresswell KM, Slee A, Coleman J, Williams R, Bates DW, Sheikh A. PLoS One. 2013 Nov 19; 8(11):e79394. doi: 10.137/journal.pone.0079394.

Using EHR data to predict hospital-acquired pressure ulcers: a prospective study of a Bayesian Network model. Cho I, Park I, Kim E, Lee E, Bates DW. Int J Med Inform. 2013 Nov; 82(11):1059-67. doi: 10.1016/j.jmedinf.2013.06.012.

Overrides of medication-related clinical decision support alerts in outpatients. Nanji KC, Slight SP, Seger DL, Cho I, Fiskio JM, Redden LM, Volk LA, Bates DW. J Am Med Inform Assoc. 2013 Oct 28. doi: 10.1136/amiajnl-2013-001813.

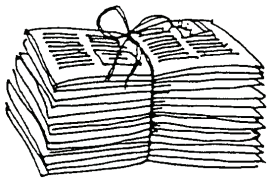
Impact of an automated email notification system for results of tests pending at discharge: a cluster-randomized controlled trial. Dalal AK, Roy CL, Poon EG, Williams DH, Nolido N, Yoon C, Budris J, Gandhi T, Bates DW, Schnipper JL. J Am Med Inform Assoc. 2013 Oct 23. doi: 10.1136/amiajnl-2013-002030.

Use of health information to reduce diagnostic errors. El-Kareh R, Hassan O, Schiff GD. BMJ Qual Saf. 2013 Oct; 22 Suppl 2:ii40-ii51.

The global burden of unsafe medical care: analytic modeling of observational studies. Jha AK, Larizgoitio I, Audera-Lopez C, Prasopa-Plaizier N, Waters H, Bates DW. BMJ Qual Saf. 2013 Oct; 22(10):809-15. doi:10.1136/bmjqs-2012-001748.

Advancing the research agenda for diagnostic error reduction. Zwaan L, Schiff GD, Singh H. BMJ Qual Saf. 2013 Oct; 22 Suppl 2:ii52-ii57.

The impact of medical informatics on patient satisfaction: a USA-based literature review. Rozenblum R, Donzé J, Hockey PM, Guzdar E, Labuzetta MA, Zimlichman E, Bates DW. Int J Med Inform . 2013 Mar; 82(3):141-58. doi: 10.1016/j.ijmedinf.2012.12.008. Epub 2013 Jan 17. Review. PMID: 23332922



Take a look at some recent publications by members of the Center!

THE CENTER FOR PATIENT SAFETY RESEARCH AND PRACTICE

TRANSFORMING PATIENT CARE

RESEARCH AND INNOVATION TO IMPROVE QUALITY

EverOn Award, continued

(Continued from page 1)

decompensation. These times will then be compared to those recorded in the same units before the EverOn system was implemented to establish whether the EverOn system significantly improves operations. Finally, the team will explore the factors associated with alarm rates and alarm response.

The team proposes a multi-site, descriptive, qualitative study to achieve these goals. The data collection procedures will first be refined and validated at Newton-Wellesley Hospital, which has been using the EverOn system since 2011, before the study proceeds with data collection at additional sites.

Katharina Steininger, continued

(Continued from page 6)

Because her experience in the Center's Global Fellows Program was so positive, Dr. Steininger has fallen in love with the city and its people, grateful for the opportunities they have allowed her. With a smile, she sums up her time as a Global Fellow very simply. "This is one of the most interesting experiences I've ever had."

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