Multi-Grantee Technical Assistance Webinar: Tools and Technology for Improving Care Post-Treatment

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1. Background

The Agency for Healthcare Research and Quality (AHRQ) Health Information Technology (IT) Portfolio provides ongoing technical assistance (TA) to grantees in the form of Webinars, one-on-one technical assistance, and peer-to-peer teleconferences through the National Resource Center for Health IT (NRC). Webinars provide opportunities for grantees to hear presentations from leading subject matter experts (SMEs), communicate shared experiences, address common challenges, become informed of proven successful research methods, and share other considerations in an open format.

Quality of care does not end in the hospital or provider's office. Coordination of care post-treatment is essential to patient safety and is increasingly the focus of national quality measurement and requirements. Whether it be providing patients with adequate information regarding post-treatment followup and medications, helping patients adhere to care plans, or ensuring that the care team has all the required information on a patient, the area of post-treatment care provides opportunities for improvement and for health care services research. Health IT can play a key role in streamlining and improving post-treatment care through various tools and technologies such as patient portals, online patient education, electronic discharge summaries, and patient reminders.

To address issues of care coordination and continuing care, the NRC sponsored this multi-grantee Webinar entitled, "Tools and Technology for Improving Care Post-treatment," on July 25, 2012, from 12 p.m. to 2 p.m. EST. The objectives of the Webinar are highlighted in the table below.

Objectives of the Tools and Technology for Improving Care Post-treatment Webinar

1. Provide an overview of the current health IT landscape as it pertains to care transitions and health services research.
2. Discuss specific health IT tools and technologies used for improving care post-treatment.
3. Share experiences and recommendations among grantees.

The Webinar was facilitated by Ms. Rachel Kell, M.P.H., and Mr. Mark Belanger, M.B.A., of the AHRQ TA team. Presenters for the Webinar were as follows:

- Jason Broad, M.B.A. Director of Lean Six Sigma, Sharp HealthCare, San Diego, CA
- Cecile Davis, M.S.N., RN-BC. Project Coordinator, Sharp HealthCare, San Diego, CA
- Brian Jack, M.D. Professor and Vice Chair for Academic Affairs, Department of Family Medicine, Boston University School of Medicine/Boston Medical Center, Boston, MA
- Lipika Samal, M.D., M.P.H.. Clinician Investigator, Division of General Internal Medicine and Primary Care, Brigham & Women's Hospital, and Instructor, Harvard Medical School, Boston, MA

2. Meeting Summary

Presentations

The facilitators, Ms. Rachel Kell and Mr. Mark Belanger of the AHRQ TA team, provided a high-level introduction to the Webinar's topics, an outline of the event's objectives, and background information on each of the subject matter experts.

Presenter: Lipika Samal, M.D., M.P.H.—Clinician Investigator, Division of General Internal Medicine and Primary Care, Brigham & Women's Hospital, and Instructor, Harvard Medical School, Boston, M.A.

"Health Information Technology to Support Care Coordination and Care Transitions"

Dr. Samal's presentation focused on her work on a paper commissioned by the National Quality Forum (NQF) for a recent round of care coordination quality measures submission request. She noted that ultimately there were no care coordination quality measure submissions, pointing out that perhaps the industry is not yet ready to use health IT to measure care coordination.

Dr. Samal noted that the core clinical data elements that tend to be the simplest to transmit across places of service are problem lists, allergies, and medication lists. However, there are health care organizations where even these simple data elements are not being shared among providers. Dr. Samal explained that in her paper, she strived to emphasize the development and use of population tools to close existing gaps in care coordination. Her paper addressed the current needs for functionality in care coordination (e.g., reconciling medications, tracking laboratory tests, tracking referrals to and from primary care providers [PCPs]).

Discharge summaries and patient education provide opportunities for improvement and quality measure development. Discharge summaries are often brief and illegible, making communication and care post-treatment difficult. Increasing patient education and engagement would also improve care post-treatment by improving adherence to medication and post-treatment care guidelines. Both of these items could be valuable care coordination tools once current concerns are addressed. Certain populations (e.g., geriatric patients) have distinct data needs; therefore, a multidisciplinary approach is required to improve care coordination.

Dr. Samal discussed the results of a survey conducted by Terrance O'Malley, M.D., at Partners Healthcare in Boston, Massachusetts, in which 300 data elements were reviewed and receivers' needs were assessed. More than 1,135 surveys pertaining to care transitions were completed by 46 health care organizations in central Massachusetts. The survey identified data elements that were required, optional, or unnecessary for different types of care transitions. The survey found that many ambulatory settings have no system for tracking referrals and that, even in fully electronic practices, referral requests and consultation reports are often transmitted by fax and scanned into systems as PDFs. Care coordination would benefit from the creation of a referral template to facilitate bidirectional communication.

Dr. Samal next outlined various technical and organizational barriers to care coordination and proposed approaches to overcome them.

Technical Barriers

Data

The current lack of data standards is a significant technical barrier to care coordination. Different systems are unable to communicate and exchange data in a streamlined or accurate way without data standards being enforced. The Office of the National Coordinator for Health Information Technology (ONC) has worked to address the issue of data standardization, and the Healthcare Information Technology Standards Panel (HITSP) is working to align Federal, State, and private-sector approaches to standards.

In addition, storing data in different systems impedes meaningful research and quality measurement on care coordination. Dr. Samal noted that the storage of pre- and post-transition data in different systems can introduce measurement bias.

Documentation

Clinical documentation in electronic health record (EHR) systems is encounter based, making it difficult for a provider to follow a patient over time. Ideally, documentation would be longitudinal and collaborative. Innovative interfaces should be developed to display patient medical histories in a longitudinal format. Population management tools with electronic task tracking could present clinical data in a manner that would facilitate care coordination. Documentation must be optimized to be efficient, yet complete enough to support research and measurement.

EHR Systems

According to Dr. Samal, many health care organizations use legacy, homegrown EHR systems or outdated versions of commercial EHRs; these systems may lack the ability to perform care coordination tasks electronically. In addition, clinical decision support may not support auditing and may also not risk-adjust for patient medical history. Integration of insurance claim information such as prescription refills would help present a more complete picture of a patient's history. The creation of patient health portals offering bidirectional communication between patient and provider could facilitate improved care coordination as well.

Organizational Barriers

EHR Systems and Workflow Issues

There is resistance among providers and health care organizations against updating EHR systems, and vendors lack incentives to become interoperable and cooperate with other vendors. Change management obstacles and workflow redesign challenges arise because of providers' comfort level with their current systems and processes as well as their time constraints. Most clinician system training is limited, which results in an incomplete understanding of a system's capabilities and how they should best be used.

In addition, provider EHR documentation is often optimized for billing, not caregiving, which encourages template creation and the copying and pasting of information into notes. This method of documentation can contribute to cognitive errors and has led to malpractice cases.

Addressing these organizational barriers will be challenging; however, possible solutions include payer reimbursement for care coordination, incentives for health information exchange (HIE), and ongoing system training and support for clinicians.

Communication

Currently, there is a need for the coordination of care plans between primary care and specialty disciplines; primary care physicians and specialists must have an understanding of the overall care being provided to their patients and their respective roles in the care continuum to optimize co-management. It would also be beneficial to define roles and responsibilities for care team members as well as to create service agreements wherever needed.

Patient Concerns

Patient concerns about privacy and security related to electronic transfer of sensitive information (e.g., mental health, substance abuse) can hinder optimal care coordination. Dr. Samal suggested that patients be supplied with a list of care team members so that they are aware of who is accessing their medical information.

Presenters: Jason Broad, M.B.A.—Director of Lean Six Sigma—and Cecile Davis, M.S.N. RN-BC—Project Coordinator, Sharp HealthCare, San Diego, CA

"Remote Patient Monitoring Program: Congestive Heart Failure"

Mr. Broad and Ms. Davis presented an overview of their Remote Patient Monitoring Program for Congestive Heart Failure (CHF) at Sharp HealthCare, which was sponsored by a grant from the Center for Technology and Aging, located in Oakland, California. The purpose of the project was to reduce unnecessary CHF patient admissions and readmissions by monitoring patient weight and other symptoms and to empower patients to manage their heart failure at home through the use of telemedicine. The project also included providing ongoing education to the patient. The target population was underserved populations, including Medi-Cal, Medicare Fee for Service, and self-pay patients. In addition, CHF patients with a history of readmissions and high emergency department (ED) use were included. This population had a 20-percent readmission rate, and CHF patients made up a significant number of patients, thereby providing a good target for intervention.

Sharp HealthCare is a not-for-profit integrated delivery system in San Diego composed of four acute care hospitals, three specialty hospitals, two affiliated medical groups, three philanthropic foundations, and a health plan. It is the largest private employer in San Diego, with approximately 14,000 employees and 2,600 affiliated physicians.

Ms. Davis provided an outline of the remote patient monitoring intervention. Patients were assessed in the hospital by a program coordinator and given a toolkit consisting of educational materials and a home plan of care for managing their heart failure symptoms. Each patient received a home visit at the start of the program that focused on patient education and medication reconciliation. This was followed by 90 days of remote patient monitoring using a telehealth scale supplied by Cardiocom®, with which patients documented their symptoms and weight. Cardiocom provides machines that transmit both subjective and biometric data from patients to a care team on a daily basis. Data are uploaded to a database and can be accessed anywhere via the Internet. Alerts are generated when a patient's symptoms reach 20 percent severity, and a phone call is made to the patient. The system includes chronic disease management education and has been used with CHF patients with good results. Ninety days was chosen for the duration of the intervention, as this has been shown to be the average time needed for adults to learn a behavior. Phone calls between the patient, program coordinator, and the vendor's remote monitoring nurses took place as necessary, and the patient received a final home visit at the conclusion of the program.

Ms. Davis noted that both Sharp Healthcare's 30-day readmission baseline rate and the readmission rate of those patients who dropped out of the program was 20 percent. In comparison, the 30-day readmission rate for those patients who completed the 90-day intervention was 7.8 percent. The overall readmission rate for participants in the program (those who completed the 90-day intervention as well as those who dropped out during the study) was 10 percent, a notable improvement from the baseline of 20 percent.

The other main component of the program was patient activation, specifically empowering CHF patients to manage their heart failure at home. When selecting a tool to measure patient activation and to evaluate the effectiveness of the education/coaching program intervention, the team looked for an evidence-based tool that was easy for patients to self-administer, low cost, available in multiple languages, disease specific, made to target patient-specific needs, and that could be used to assess a patient's growth in the program. The researchers selected the Self Care Heart Failure

Index (SCHFI) to conduct the baseline preintervention evaluation, which was administered to patients by the program coordinator in the hospital or during the first home visit. Post-intervention, the SCHFI was again administered to patients during the discharge home visit.

Ms. Davis then presented the results of measuring patient activation using the SCHFI tool. Scores greater than 70 percent are indicative of self-activation; 98 percent of patients scored greater than 70 percent on the SCHFI maintenance domain after completion of the program. When assessing quality-of-life outcomes, the researchers found that before the study, only 19 percent of patients had the confidence to manage their heart failure and associated symptoms; however, that proportion increased to 92 percent after the intervention.

Finally, Ms. Davis reviewed some of the lessons learned from the CHF remote patient monitoring program. The researchers found it challenging to balance good survey administration protocols with the program's demographic, which consisted of an underserved population with prevalent mental health and literacy issues. In addition, they discovered that many patients have a false sense of confidence in their self-management skills. Although the SCHFI was initially used for measurement, throughout the study it became useful as a tool to help understand each patient's specific needs.

Mr. Broad emphasized that the program employed a comprehensive approach and that many aspects of the intervention contributed to its overall success. Remote patient monitoring, patient education, home visits, nurse monitoring, and personal health coaching all acted in synergy. The research team had an excellent relationship with both the technology vendor and the nurses working with the patients, and the team of nurses was highly invested in the success of the program.

Presenter: Brian Jack, M.D.—Professor and Vice Chair, Department of Family Medicine, Boston University School of Medicine, Boston, MA

"Louise: A Virtual Patient Advocate for Hospital and Post Hospital Care"

Dr. Jack presented his group's work with an embodied conversational agent to prepare patients for posthospital care. His team has been involved in care transition for more than 10 years and had previously received funding through AHRQ for Project Reengineered Hospital Discharge (RED). Project RED used engineering principles such as root cause analysis, probabilistic risk assessment, qualitative analysis, process mapping, and failure modes effects analysis (FMEA) to examine hospital discharge in detail. Though this method, they developed the following list of 11 elements that should take place at the time of patient discharge:

- Medication reconciliation
- Reconciliation of discharge plan with National Guidelines
- Followup appointments
- Outstanding tests
- Postdischarge services
- Written discharge plan
- Contingency plan in case problems arise
- Patient education
- Assessment of patient understanding
- Discharge summary to PCP
- Telephone reinforcement

The randomized controlled trial of Project RED analyzed 30-day, all-cause readmission among 750 patients and found that the interventions decreased readmissions from 20 to 15 percent and ED visits from 25 to 17 percent. The researchers anticipated that hospital administration would want a more efficient way to perform the RED and would have concerns about how busy staff could fit the RED into their workflow. Therefore, they began to test a virtual patient advocate that had been programmed to educate patients on their after-hospital care plans to prepare them for self-care after their return home.

Dr. Jack's recent work used an embodied conversation agent (ECA) to perform the RED to prepare patients for hospital discharge. Two virtual characters, Louise and Elizabeth, emulated face-to-face communication and developed a therapeutic alliance with patients through gaze, posture, gesture, and empathy. The ECA was able to perform RED and determine a patient's competency and understanding of his or her individual discharge plan using the teach-back method, consisting of followup questions and tests. The system printed a report at the end of the interaction to summarize information for the nurse, including what the patient did and did not understand about his or her after-hospital care plan.

To develop the ECA system, the researchers videotaped nurse–patient interactions teaching the RED and tried to emulate this real-world scenario with the ECA. The system is on a kiosk that is positioned over a patient's bed, and the patient uses a touch screen to interact with Louise or Elizabeth. The ECA reviews the patient's after-care plan with him or her page by page. The touch screen system is easy to use, and there have been no issues with patients' ability to use the computer. If a patient is unable to read, the ECA can read the buttons on the screen aloud.

The ECA system is an enormous one that required 3 years of interdisciplinary collaboration and development involving multiple doctors, nurses, pharmacists, computer scientists, animators,

graphic artists, statisticians, and health literacy experts. Currently, the system contains more than 2,000 medications, 48 different diagnoses, and 32,000 lines of dialogue.

The team evaluated the usability of the system and found a high level of overall satisfaction with the ECA and its ease of use. In addition, when assessing their relationship with the ECA, patients stated that they considered Louise to be more of a friend than a stranger and had a high level of trust in her. When asked if they felt the ECA cared about them, most patients replied that they felt Louise cared about them very much, and patients also reported that they perceived a high level of understanding between themselves and the ECA. Thirty-six percent of patients indicated that they preferred receiving discharge instructions from an agent, 48 percent of patients were neutral, and only 16 percent expressed a preference for a doctor or nurse. Study participants noted such sentiments as "I prefer Louise—she's better than a doctor, she explains more, and doctors are always in a hurry."

Recently, Dr. Jack's group conducted another randomized controlled trial of the ECA system called the RED-Lit intervention, funded through a health literacy grant, funded by AHRQ, the National Heart, Lung, and Blood Institute, the Blue Cross Blue Shield Foundation, and the Patient-Centered Outcomes Research Institute.[1] Those patients in the intervention group received an initial interaction to become acquainted with the ECA, a final interaction involving an interactive explanation of their discharge plan and medications, and a follow-up call from an automated system or a pharmacist. Of the patients who received a final ECA interaction and a phone call, the relative risk of reutilization was 0.58 (a reduction of 42 percent). After controlling for covariates such as age, sex, substance abuse, and length of stay, those patients who received the full intervention had a 36-percent lower risk of hospital readmission.

Dr. Jack's team is also working on a postdischarge Web-based system designed to emulate the post-hospital phone call to promote medication and appointment adherence and to detect adverse events. Patients access the system on their home computers, and any alerts generated are sent to a nurse each morning who follows up with the patient, if necessary. The ECA asks patients why they are not adhering to their treatment plan and discusses ways of overcoming any barriers based on their responses. A small randomized controlled trial of 43 patients was performed as a test of the postdischarge Louise system, and the early results were encouraging. Of the 24 subjects in the intervention group, only four used the system; however, of those four, no ED visits or hospital readmissions occurred. In contrast, both ED visits and readmissions were seen in the control group as well as among those patients who did not use the system. In addition, those four patients who did use the system generated 31 alerts, so it is likely that the creation of these alerts resulted in nurse followup and prevented readmission.

Patients reported satisfaction with postdischarge Louise, because they were able to interact with a clinician more easily and could have multiple contacts per day, if necessary. The system is a more robust intervention than a 2-day postdischarge phone call, because patients have more than one interaction. Notably, half of discharged patients need postdischarge assistance at some point, and this system enables identification of which patients need that help. There are also implications for capitated programs, such as the Patient-Centered Medical Home (PCMH) and Accountable Care Organizations (ACOs), because providers see fewer patients in the office and can bill for online interactions in some cases, with fewer ED visits resulting in savings for the system.

[1] Source: https://www.bu.edu/fammed/projectred/ourteam.html

3. Questions and Answers

Participants asked questions during each presentation, as well as at the end of the Webinar. These questions and the responses from presenters are provided below.

Question 1: Dr. Samal, what are your thoughts about HIEs and their future?

Dr. Samal indicated that progress has been made in the area of HIE overall; however, some aspects have seen vast improvements, while others have not. In her experience, there are still many highly advanced health care organizations that do not transmit information electronically across different care settings or do not provide clear documentation of what is being sent and received.

Question 2: Dr. Samal, what continuous care plan recommendations can nurses create that could help manage the multiplicity of systems among hospitals in which discharge information is recorded, and among providers who do not all use the same system to document their findings?

Dr. Samal indicated that her project is currently exploring the idea of a cross-conditions care plan in which patients' goals are centralized across different conditions, times, and settings. In her experience, few patient-centered data elements are being recorded, and no standard taxonomy or template exists.

Question 3: Mr. Broad, has your team considered how outcomes might have changed if one of the components of your success—remote patient monitoring and personal health coaching—were to be removed?

Mr. Broad replied that they would need to run three concurrent study groups to assess that concern and because of time and resources, it could not have been done at the time. However, should it become feasible, they would have one intervention group receiving remote patient monitoring only, another group with personal health coaching only, a group with both interventions, and a control group with no intervention. This would allow them to assess the impact of each intervention individually. He noted that of those patients readmitted and those not readmitted, the compliance with using the Cardiocom technology is similar, so the effect could result from the personal health coaching. It is important to note that the study population was underserved and in poor health; most lived alone, and approximately 40 percent had a mental health diagnosis. It is unclear whether the same interventions would be required for a different population that is more involved in its health care.

Question 4: Mr. Broad, did the researchers observe any impact on patient health outcomes other than readmission (i.e., smaller changes, such as weight or dietary choices)?

The presenters clarified that the patient activation tool assessed what behavioral changes took place and that patients received coaching and monitoring to ensure that they were doing what they reported. The participant was curious about whether any measures were recorded in a physician's office that demonstrated impact of the intervention on patient health. Mr. Broad replied that the research team did not have access to information from the patients' PCPs;

however, they did have patient data from the hospital as well as an analysis of patient weight at the start and finish of the intervention.

Question 5: Mr. Broad, how difficult is it to move from a patient activation outcome to an actual health outcome?

The research team noted that they used the hospital readmission rate across the four hospitals in the Sharp HealthCare system as a health outcome. The hospital system is large, and patients tend to be loyal, so the number of patients who may have been admitted to a hospital outside the system would likely be negligible. The readmission rate was based on a 30-day timeframe that began with the patient's discharge prior to entering the program. If a patient was readmitted, the process would begin again. The research team noted that there were no patients with more than one 30-day readmission.

Question 6: Dr. Jack, did you see barriers to patients using the Louise system from home, because so few patients used the system?

Dr. Jack explained that the research team did not evaluate barriers among the study participants and noted that further research is required. He raised the possibilities that patients did not like using computers, patients did not want to interface with the system from home, or perhaps patients did not want to interface with their clinicians via the Louise system. One of the prerequisites for participation was that patients needed to have a home computer or access to a computer. In the future, the research team may only look at patients who have home computers. One other possibility is that those who used the system were those patients who needed help and that those patients who did not use the system did not have postdischarge needs.

Question 7: Dr. Jack, at what point would the Louise system become cost-effective?

Dr. Jack stated that it takes a long time to develop the system and enter the necessary data. Designing the system takes time and money; however, once it is designed, it is simply a matter of maintaining the software. The system is scalable as well; after the program is designed, it can be tested before dissemination is performed on a large scale.

Question 8: Dr. Jack, whose job is it to initiate the system for patients in the hospital? How are patients assigned to Louise?

Dr. Jack clarified that research nurses enrolled patients in the study, and these nurses wheeled the system into patients' rooms and initiated the ECA interaction. Patients' information was entered into a software program that was created as part of Project RED. This same program feeds Louise all the information necessary to interact with the patient.

Hospitals may choose to accomplish this in different ways in the real world. The nurse providing care may be the one to initiate the system for each patient. Dr. Jack noted that his team is currently talking with various hospitals, and each hospital is handling activation of the ECA differently.

Question 9: Dr. Samal, did you find any ways to manage responsibility hand-offs between primary care providers (PCPs) and specialists during your research on care transitions?

Dr. Samal responded that there are two issues to consider. The first is a process issue: A system for documentation and tracking must exist. However, a bigger issue is that the medical culture is such that physicians do not believe in hand-offs, working with other physicians, coordination of care, etc. Technology and policies need to be put in place to ensure that clinicians are coordinating care with others.

Question 10: Mr. Broad, what other symptoms and vitals besides weight could be tracked though the Cardiocom® monitoring machine?

Mr. Broad noted that other vitals and symptoms could be tracked; however, his program included weight only. The machine can test blood pressure, blood sugar, etc., but in this instance only a scale was included. The setup time for the machine was quick, and the system can be connected through a land line or cellular phone and upload information to the Web.

Question 11: Dr. Jack, was the ECA module for your study developed in-house? If so, is it being marketed outside your organization?

Dr. Jack explained that the program was developed in-house through a series of Federal research grants. The idea for Louise was conceived approximately 7 years ago. At this point, the return on investment is unknown. He noted that today's participants are the first group to see data presented on both Louise systems, and his team is in the process of putting together papers to disseminate the results.

4. Appendix: Presenter Bios

Presenter: Lipika Samal, M.D., M.P.H.

Lipika Samal is a clinician investigator in the Division of General Internal Medicine and Primary Care and an instructor at Harvard Medical School. As part of a National Institutes of Health (NIH)-funded General Internal Medicine fellowship program at Johns Hopkins School of Medicine, she pursued training in informatics, epidemiology, and biostatistics. Her research interest is in developing and evaluating health IT to support high-quality, patient-centered care.

Contact email: lsamal@partners.org

Presenter: Jason Broad, M.B.A.

Jason Broad is the director of Lean Six Sigma for Sharp HealthCare (San Diego) and is responsible for implementing Six Sigma, Lean, Work-Out and Change Acceleration Process at Sharp HealthCare to improve operational, financial, and clinical performance. Mr. Broad has 15 years of experience in health care at hospitals across the country, working extensively in IT, finance, and clinical effectiveness.

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Presenter: Cecile Davis, M.S.N., RN-BC

Cecile Davis has been the project coordinator at Sharp HealthCare (San Diego) for two hospital readmission projects in management of congestive heart failure and chronic obstructive pulmonary disease using telemedicine. She received her master's degree in geriatric nursing from George Mason University and is board certified by the American Nurses Credentialing Center in cardiac-vascular nursing. Mrs. Davis has been involved in chronic care management and patient education for the past 12 years and has been a nurse for 30 years.

Contact email: Cecile.Davis@sharp.com

Presenter: Brian Jack, M.D.

Brian Jack is professor and vice chair for academic affairs in the Department of Family Medicine at Boston University School of Medicine/Boston Medical Center. Dr. Jack graduated from the University of Massachusetts Medical School and completed his residency training at Brown University. He completed a fellowship at the University of Washington. Dr. Jack has written more than 100 peer-reviewed papers or book chapters and is principle investigator (PI) on grants from the Health Resources and Services Administration, U.S. Centers for Disease Control and Prevention, AHRQ, National Heart Lung and Blood Institute, Patient-Centered Outcomes Research Institute, and National Institute on Minority Health and Health Disparities.

For his work relating to improving patient safety at hospital discharge (Project Reengineered Hospital Discharge), he received the "Excellence in Patent Education Innovation" award and the AHRQ "Patient Safety Investigator of the Month." In 2009, he was selected as one of 20

nationwide to appear on *HealthLeaders* magazine's "People Who Make Healthcare Better" list. He has also received the CDC "Partner in Public Health Improvement" award and was listed among "Boston's Best Doctors" for 2010 and 2011. His *Annals of Internal Medicine* article is described in the book *50 Studies Every Physician Should Know*.

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