

NATIONAL WEB-BASED TELECONFERENCE ON HEALTH IT: USING HEALTH IT FOR CHRONIC DISEASE MANAGEMENT

BEGIN TRANSCRIPT:

MODERATOR: Hello and welcome to the AHRQ webcast entitled Using Health IT Chronic Disease Management. At this point I'd like to introduce today's moderator Angela Lavanderos, program analyst with the Health IT portfolio Agency for Healthcare Research and Quality.

ANGELA LAVANDEROS: Thank you Jack. Good morning and thank you all for participating today. I would like to introduce you to our panelist presenters. Dr. James Friction is a senior research associate at Health Partners Research Foundation and a professor at the University of Minnesota School of Dentistry, School of Medicine, School of Public Health. He is also a fellow at the Institute for Health Informatics at the University of Minnesota. Dr. Friction has over 30 years of experience in patient care, research, and teaching in chronic pain and the use of the impact of health information technology in clinical decision support of improving safety, quality, and cost effectiveness of health care in consumer health.

His sponsored research has focused on the epidemiological studies in clinical trials of therapeutic strategies for chronic pain conditions. He has developed a biobehavioral framework for personalized care of chronic pain conditions and has integrated this pain research with studies of health information technology focusing on the use of electronic health records, personal health records, and clinical decision support to improve the outcomes in quality of healthcare.

Dr. Friction received his BS in post graduate training in computer science as well as a DDS degree from the University of Iowa. He also received an MS in oral biology at UCLA and completed an anesthesiology and pain management residency at UCLA Medical Center. Finally, Dr. Friction joined the faculty of the University of Minnesota in 1980.

We also have Helene Kopal. She's the divisional director at Primary Care Development Corporation where she oversees division projects focused on the introduction and sustainment of clinical, technology, and process improvements in the community healthcare setting. She is currently the principal investigator on an AHRQ funded study evaluating the role of enhanced electronic medical records on clinical practice in the management of hypertension in a community healthcare center.

Ms. Kopal has over 15 years of experience working on disease management programs having developed and managed chronic disease management programs at Empire, Blue Cross/Blue Shield, and Oxford Health Plans with responsibility for the design and

building of registries, the development of data collection and analyses, and quality improvement procedures, as well as process and outcomes assessments in multiple areas including chronic and infectious disease, medication management, high risk maternity, and others. Ms. Kopal received her Bachelor's degree in European history from Connecticut College in New London, Connecticut and a dual Master's Degree, MPA/MPA from Columbia University in New York, New York.

Finally we have Dr. Randall Cebul. He's a professor of medicine and epidemiology in biostatistics at Case Western Reserve University's School of Medicine and director of the Case Western Reserve University's MetroHealth System Center for healthcare research and policy. As a general internist Dr. Cebul's research focuses on clinical research methods, quality of care measurement, and clinical decision support for chronic conditions in primary care. He sits on numerous federal and national foundation advisory committees, and has served as president of the International Society for Medical Decision Making, as inaugural chair of Ohio Medicaid Technical Assistance and Policy Program, and as a governor's appointee to the Ohio Medicaid Reform Review Committee.

Dr. Cebul's recent research includes the large AHRQ funded trial of electronic medical records to facilitate decision support in diabetes. Dr. Cebul is also director for Greater Cleveland's Aligning Forces for Quality Initiative known as Better Health Greater Cleveland which is supported by the Robert Wood Johnson Foundation in order to improve outcomes of care among patients with chronic medical conditions throughout northeast Ohio.

Better Health Greater Cleveland's infrastructure and documented improvement has built upon the foundation laid in Dr. Cebul's AHRQ supported trial. Dr. Cebul received his MD at Yale, trained in internal medicine, and as a Robert Wood Johnson Foundation Clinical Scholar at the University of Pennsylvania, and also served as faculty at the University of Pennsylvania. Dr. Cebul joined the Case Western Reserve University in 1987 as Division Chief in General Medicine.

So as you can see you have quite a talented and knowledgeable panel of presenters today. Before we begin today's session we are required to read the following statement for CME purposes. This educational activity has been approved by the Wisconsin Medical Society for 1.5 AMA/PRA category one credit. Speakers and planners are required to make disclosure of any relevant financial relationships which may be related to the subject matter discussed. Speakers and planners for this educational activity have made proper disclosure and have no relevant financial relationship that exists now or in the past 12 months.

So with that I'd like to begin today's web conference. Dr. Friction will begin today's web conference by presenting findings from a randomized clinical trial of clinical decision support that integrates electronic dental, medical, and personal health records. The three arm two year perspective group randomized clinical trial was implemented with 160 healthcare providers in 17 clinics with more than 7,500 patients to demonstrate the efficacy of implementing two different clinical decision support strategies that provided

personalized recommendations to the healthcare provider and compared them to usual care without CDS. He will also discuss future areas of need for tools to engage consumers and providers using health information technology that are in development. Dr. Friction, you may begin.

DR. JAMES FRICTON: Thank you very much Angela. It's certainly a pleasure to be here this morning for this webinar, and I want to thank everybody who is attending the webinar at this point. I appreciate your interest in the topic. The title of my presentation is The Use of Electronic Health Records to Improve Quality and Safety of Dental Care for medically complex patients. And I'd like to acknowledge the appreciation for my contributions of my following co-investigators, Dr. Brad Rindal, Dr. Flottemesch, Merry Jo Thoele, Chris Enstad, Paul Jorgenson, Dale Rush, Gabriela Vazquez, Emily Durand, Nelson Rhodus, and Charles Huntley as well as support from AHRQ.

Everybody knows that the chronic illness is one of the most expensive and highly problems within our healthcare system and within the United States. Medical conditions such as diabetes, obstructive pulmonary disease, depression, and congestive heart failure are very high cost and prevalence. From a dental perspective these patients also have increased risks for periodontal disease, dental carries, orofacial pain, and complications both during and after treatment and a variety of different reports including the U.S. Surgeon General's report in 2000 and the Institute of Medicine calls for more links between dentistry and medicine. And there's a need to better train dentists when caring for patients with chronic medical conditions.

Dentists need to recognize and follow evidence based guidelines while caring for patients with these conditions, and this will result in improved safety and quality of care. There's been a lot of effort with this regard including from the American Academy of Oral Medicine have developed guidelines to identify and change their care in order to respond to the needs of the patient. But despite the availability of guidelines, the use of this of information at the point-of-care has been low and not because dentists are not interested, it's just that there's difficulty in translating evidence based guidelines into practical changes on the day to day basis in clinical practice.

With the emergence of health information technology the potential for improving the quality and safety of medical care and dental care can occur through several strategies. One, of course, HIT can enhance communication between clinicians and patients. Number two is that it can facilitate the exchange of health information between and among teams of healthcare providers and with patients also. Number three is it can improve access to personalized and evidence based guidelines that match the specific characteristics of the patient. And number four is that we can also activate both patients as well as clinicians through reminders, alerts, and point-of-care introduction of appropriate information.

So we conducted a study to try to determine whether health information technology, as implemented through specific clinical decision support, or CDS to answer some questions. Can the CDS through electronic dental records or with patients through

personal health records activate a dental provider towards the use of care guidelines? And will this change provider and patient behavior? And if it does will it also improve outcome to care?

So we conducted that's a prospective group randomized trial comparing two methods of clinical decision support compared to a usual care control group. We had two specific interventions. One that was involved with direct provider alerts in the electronic dental record with point-of-care access to personalized evidence based guidelines that were specific to each individual patient. Number two is that we also implemented a patient alert, a direct patient alert, through the patient's personal health record e-mail, or if they did not have e-mail we sent a postal letter to review with dental provider the personalized evidence based recommendations. So one intervention was a provider alert with specific information. The other was a direct patient alert. And we compared these two interventions to a control group.

The population that we implemented this study in were over 10,000 patients from HealthPartners. It's a large health system in Minnesota that had one or more of the following conditions: Diabetes, Xerostomia particularly from secondary from medications, Chronic Obstructive Pulmonary Disease, and Congestive Heart Failure. And we found in the population of dental patients, which included 59,147 patients that were part of the HealthPartners dental plan, that 18.4 percent of these had one of these or multiple of these medical conditions.

The dental providers that we then implemented this system in were 15 dental clinics with 102 dental providers. They were randomly assigned to the two experimental groups and the usual care group. We had 62 dental hygienists and 40 dentists that were involved in the study.

Here is the study protocol that we used. Patients were scheduled for an appointment in the dental clinic through the electronic dental records. At this point the EDR searches the EMR, the electronic medical record, for whether or not the patient had a specific diagnosis. We used a specific algorithm that we've used before as part of our registry process to identify those patients through blood diagnosis, pharmacy data, as well as billing data to determine if the medical condition was present. If it was present, then these patients were randomly assigned based on their clinic that they attend to one of the three groups, either the dentist intervention, the control group in the middle, or on the right the patient intervention. And in this case, then the patients and the dentists were not aware of the study at the time so this is a blinded study.

So if the dentist received an alert in their electronic dental record then they would click on the alert and they would access personalized recommendations. If the patient received an e-mail or a postal letter, they then bring this to the dentist and the patient will then alert the dentist that they should review their personalized guidelines. The guidelines were also available on a website to every dentist at HealthPartners dental group. And so the control group, even though they received no alerts and would provide usual care, these dentists also had access to their clinical guidelines for a specific patient.

The eDent, we called it, system which is a clinical decision support system involved, as I mentioned before, the registry of patients to identify patients. We then identified through the HealthPartners Research Foundation's server algorithms that would identify what guidelines were specific for that particular patient. At this point the server would then send an alert over to the Dentistry Server in the electronic dental records. At this point then the algorithm also searched the records and the dental record determined whether that patient had a specific appointment on a particular day. And if it was, then that alert would be turned on, and we expect that alert then to change the care or the dentist to change the care in response to the alert and accessing the guidelines.

So let me show you the guidelines that we discussed and personalized. This is just a table that refers to some of the changes in care that we recommended as a result of say Diabetes, or Xerostomia, and you can see there's a lot of focus on improving oral hygiene and increasing visits to the dentist and the dental hygienist. And as noted, most of the clinicians were dental hygienists that were involved in this study. With Xerostomia we recommended that they review the saliva production because this increases the risk of caries, oral infection risk. With congestive heart failure we wanted the dentists to change the care to reduce cardiac strain, shorter visits, more comfortable visits, and we focused again on daily oral hygiene. The COPD group, we also reviewed the use of specific medications that will aggravate the condition. We also changed the behavior and the care to have a shorter visit, upright positions, and we used a variety of other changes. All of these were designed to reduce the risk of disease and complication.

In the next slide this shows some samples of the screen shots that we used. Here's the electronic dental record. And the alert that we used is right here the little red health red cross, and this would also refer to a box down here that would identify the patient at risk, and they can click on the alert which this is a red flashing light. And when they click on that alert, it would bring them to a specific screen which is hosted in the research foundation server. And this screen would pull out specific personalized recommendations that match the patient's condition. So if they had two conditions they would have specific information about those two conditions with regard to that patient's care.

Now here are some of the results of the characteristics of the study population. As noted, we had 18.4 percent of the dental patients were included in this study. And we had five clinics in each of the three different intervention groups. And we had between 31 and 38 dental providers. As noted, most of them were dental hygienists; a little bit more than half were dental hygienists. And the number of patients that we had with different conditions the highest was Any of the conditions, Diabetes was next with 12 percent or Xerostomia. Diabetes was eight percent in this particular group. Diabetes was 12 percent, COPD was two percent, and Congestive Heart Failure one percent.

In the next slide I can show the changes in the number of times that a provider who is related to a specific patient clicks on the personalized recommendations for that patient. And you can see on this that the blue is the control group, the red is the electronic dental record alert, and the green is the personal health record alert. Now we did track the

number of times a provider would access the guidelines for six months prior to implementing the intervention. So we found that there was a varied degree of use of the guidelines. We had a continuing education course for dentists. We announced the availability of the guidelines to the dentists in newsletters, and we also presented to each of the clinic coordinators that these guidelines were available. And one of the difficult things, of course, with guidelines is that they are not readily available at the point-of-care. And so you can see that the number of hits per provider was less than .5 so less than half of the providers really accessed the guidelines at all.

Now then when we turned the system on we found a large spike in the alerts in the electronic dental records as well as the alerts to the personal health record to the patient. Although you can see that there was more hits, or more times that providers accessed the guidelines in response to the alert in the electronic dental record than in the personal health record. Now it's also important to note that the electronic dental record over time decreased so there was either a fatigue effect or the dentists new the guidelines adequately, did not feel that they needed to refer to the guidelines, but this gradually tapered off over the 12 months after and almost to the original baseline. And you can see that the alerts to the patient also spiked during the first couple of months, and then after that these were tapered off also. Now the interesting thing about this is the control group, the dentists had no alerts and no awareness of the study, did continue to access the guidelines in general over time.

Now here is the results that demonstrate the percentage of providers that have a hit. Now you can see that both the two experimental groups, the electronic dental record alerts and the personal health record alerts, both increased the number of the percentage of providers dramatically of those people who needed to reference the guidelines. The control group still had 20 to 30 percent of the providers using the guidelines. And so we found that both types of alerts, both through the patient as well as through the electronic dental record, did increase the providers dramatically.

So the conclusions of this study are basically that reminders in the electronic dental record directly targeting dental providers and in personal health records directly targeting patients are both effective in encouraging the use of care guidelines than reminders targeting patients. Then both types of reminder alerts have a generalized effect an increase in the rate at which providers reference guidelines and identify chronic medical conditions for all patients compared to usual care. And number three is the rate at which hits on guidelines occurs do decrease after 12 months of use. And this is a very ripe area of future research. So the value of providing an easily accessible record of relevant patient information and subsequent care guidelines at the point-of-care is clearly demonstrated as part of the study.

Now future directions, we are continuing to analyze the data to determine both changes in provider behavior and how that results in improvement in patient outcomes particularly a decrease in complications and improvement in safety as well as a reduction of emergency visits. We're also looking at to see whether it has an impact on cost of care. We're also

looking to see how to integrate this type of clinical decision support in all dental offices through health information exchange organizations. This will allow the CDS to be transferrable to any clinic both inside and outside HealthPartners. We're also looking at further research to determine how to sustain the results over time. Other strategies may be helpful. For instance, embedding the guidelines into the office notes that are required to be provided by the dentist, or it may be text that is overriding the EDR that allows the dentist to have to turn it off. So there's a variety of different ways, some which are more aggressive, some which are less aggressive. And then finally there are similar CDS's being developed for cancer tracking, weight management, implant device tracking, and chronic back pain. With that I thank you for your attention, and I'd like to turn this back over to Angela. Thank you, Angela.

ANGELA LAVANDEROS: Thank you Dr. Friction. Our next presenter will be Ms. Helene Kopal who will present on her study entitled Evaluation of a CDS and EMR linked registry to Improve Management of Hypertension in a Community Health Center. This study is an evaluation looking at whether EMR embedded clinical decision support as part of a multi-faceted quality improvement initiative contributes to improved hypertension control in a community health center. The study also includes an analysis of facilitators and barriers to provider acceptance of CDS and an analysis of relevant implementation factors. Ms. Kopal, you may begin.

K: Thank you, Angela, and you did my intro for me so I guess I'll just jump right in. And one thing I want to emphasize is that we were really looking to do this study so that it was clinician driven and really focused on a practical approach to using information technology.

A little bit about our team I'm with Primary Care Development Corporation. We are a Manhattan based nonprofit focusing on the development of Safety Net providers. We do affordable grants and loans for people who want to build health centers as well as some quality oriented services such as health information technologies, strategic planning, emergency preparedness, and other areas.

Our study site is Open Door Family Medical Centers. You see here they have four locations in West Chester County New York. And our academic partners are New York University School of Nursing and Dentistry and Columbia University School of Public Health.

So Open Door, as I said, is located in West Chester County New York. They serve about 3,000 patients about approximately 72 percent of those are Hispanic primarily immigrants from Central and South America. About 90 percent of them are at or below the poverty level. And Open Door installed eClinicalWorks EMR in May of 2007. As many of you know hypertension is a significant public health concern. It is a major risk factor for cardiovascular disease, stroke, heart attack. About 30 percent of adults in the United States have hypertension. Of those about 35 percent are controlled. And most people with uncontrolled hypertension actually have access to healthcare so we thought this was a good opportunity to improve quality of care in a major chronic disease.

We had two primary study aims for our project. The first was to test whether electronic medical record combined with clinical decision support and personalized performance feedback to providers on how they're doing is more effective in improving hypertension than improving the EMR alone. So our primary outcome of interest here is hypertension control for people who have hypertension. And we also looked at process of carried measures and these mapped to the JNC7 guidelines for hypertension. Things like whether patients have regular follow-up visits, whether they're getting their diagnostic tests, their blood work on time, whether they're asked about adherence to lifestyle recommendations, and also medication management. For this study aim we used data from the EMR, which I'll talk about a little bit more in a minute, so a major part of our project was actually obtaining data from the EMR for this study aim.

Our second study aim was to assess the implementation process and really try to figure out what are the factors that drive whether or not the providers adapt the tools that are presented in the EMR. The tools of course being the clinical decision support. And to assess the implementation process we used key informant interviews for the people who were directly involved in the implementation as well as structured interviews of the providers who were asked to use the tools before and after the intervention. So it was a mixed methods study design.

The conceptual framework we used for the study was rooted significantly in the technology acceptance model. And our thinking was that the design factor, so the way that the EMR was designed, individual factors among the providers, how they use technology, how they like to get to get information, the organizational factors of the health center, and the way the team worked would drive both the usefulness and usability of the clinical decision support as well as the compliance with the hypertension guidelines, the JNC7 guidelines I just mentioned.

So the way the project was organized was we had a pre-intervention period of 15 months so this is a period in which the providers at Open Door were just using the EMR the way it was installed in the normal course of managing their patients. And we used this time to accomplish three major things. One was to do the programming and analytical work we needed to extract the data from the EMR that we were going to use to measure the outcomes. We also used this period to assess providers. We surveyed them. One major was what they thought would be useful to them, what kind of tools they would like to help manage their hypertensive patients. We also asked them questions about how they felt about guidelines, the workflow for managing their hypertensive patients the way it was. You know whether they liked the EMR, whether they got sufficient training on it, things like that. So we really wanted to get a baseline. And then the other major task of this period was figuring out what interventions we could do using the clinical decision support. So what kind of tools and features were we going to implement in the EMR to evaluate.

So after 15 months we moved those changes in and trained the providers and the support staff, and we gave them an implementation acceptance period of about 90 days where

they were able to use the tools, raise questions/concerns, ask for more help. If we needed to tweak the system we did. And basically just give them a chance to sort of practice and get used to using the clinical decision support features. And then we resumed the data collection after that 90 day period. So we have 15 months of post implementation data which, of course, includes the EMR data as well as we went back and resurveyed the providers. On many of the questions we asked them at the outset the process of care around hypertension and also interviewed them so we had open ended discussions with them about how things were going. And then we are now, of course, in our last dot here on the graphic where we are analyzing our data. We are actually developing an implementation protocol based on our experience and disseminating our results.

So just some illustrations about what we did, this is a screen shot of the hypertension template which is a structured way of collecting data from the patient. And you see here the elevated blood pressure appears in red. Before our intervention it looked much like this sort of purplish grey color you see here. And after the intervention it shows up in red. So this is sort of an alert as to the out of range value for this result.

Just a word here we did retrain the staff in taking blood pressure. We found at our baseline assessment that there was a lot of variability and some clinical staff were not even measuring it officially the right way. So we went back and retrained them to make sure it was done properly and uniformly across all staff. This is a screen here in the middle is a structured questionnaire on medication compliance or adherence. Clinical support staff were trained to ask when they roomed the patient whether the patient had been taking their medication so that when the provider came in and saw the patient that that data was waiting for them there; the answers to those questions about medication adherence.

This is an order set. This is a single location where the different services, or tests, or follow-up that you might want to do for a patient with hypertension would appear. This happens to be the bottom half of the screen. We also have a part of medications. But you can see here, I don't know how legible it is, but here you have labs, diagnostic imaging, immunizations, follow-up appointments, and the like. So this is a place where the provider can go. It consolidates the possible things you might want to order, and they can do it in a single location. Also at the bottom are physician education information including the guidelines as well as patient education information that can be handed out to patients.

Clinical reminders, the group here at the top that are in red are overdue. The ones here at the bottom in green are not overdue. The provider can go look at this and take action, go ahead and order something that might be due, or snooze it if it's not relevant for that patient at the moment. These include other services besides for hypertension, but it includes hypertension related reminders as well.

And this is the provider performance report. This is feedback to providers. This is a report generated by the health center. And you can see across the top, providers one through five. Here this is just a dummy report. And then across the rows we have the total

number of hypertensive patients and the percent controlled both with Diabetes and without to adjust for that different threshold. And then we also included here the number of patients for which the order sets were used.

Providers were not forced or compelled really to use the order set or any of the other clinical decision support features, but they were strongly encouraged to do so. And one of the ways that we reminded them that it would be a good thing to try would be to show on their reports how frequently they used it.

So our results, this comes from the provider surveys. We found an improvement on whether providers felt that they were up to date with the science in hypertension and treatment and a significant improvement for familiarity with the JNC7 guidelines. Satisfaction with the components, that red blood pressure that I showed you at the outset was the most popular. And then some put order set the feedback and reminders overall a pretty good level of satisfaction just under four on a scale of one to five.

For the primary outcomes this is the hypertension control, and we did see a significant increase for the group overall as well as patients with hypertension but without Diabetes. You can see here the first column that the baseline of 52 percent was actually pretty good. Recall that the national average is somewhere around 35 percent so Open Door was actually doing quite nicely in terms of hypertension control. And then it was even greater for patients without Diabetes. And there was an increase for the Diabetes although not significant.

Process of care, so these are the follow-up visits, Stage one about the same. Stage two went up significantly and so did referrals to the nutritionist. Laboratory tests also improved. ECG's, blood work, and lipids all significantly improved and so were the process of care measures. So whether the patient had a valid body mass index on file and whether they were asked about their use of tobacco all went up significantly.

From a qualitative perspective this comes from the structured interviews that we did. We got a lot of positive feedback. In fact, most of it really was positive. For example, providers said that they felt that the clinical decision support validated what they were doing especially if they didn't see a lot of hypertensive. There were many different pieces to the intervention, and the combination of all the different things made them pay more attention to hypertension and how they were managing their patients.

And this is also fairly rigorous being a study with a fairly rigorous implementation. We were very methodical. We communicated a lot. We had policies and procedures. Things were documented, and we really worked hard to get buy in from all staff. So it was a more methodical implementation process.

Now on the negative side although I'm using here an example of the template, some people found the template to be a little awkward to use, and other people found the same about the order set. So we did see some people who did not think those were always so helpful. Similarly it sometimes interfered with their workflow. The questions were too

long. The tools do appear the same every time. So if you've just worked up a patient and asked them a set of questions, the next time you see that patient you do get the same questions and sometimes it seemed to be overlong to providers. And then on the third point whereas some people thought that methodological approach was helpful, other people thought it was a little too specific and overdrawn so just a sample of our qualitative findings.

The critical success factors we found were these. First is Open Door offered a culture of quality improvement, and supported learning, and change. We learned this through our surveys and our baseline interviews. It's a very QI focused health center. They really encourage people to make changes, to try new things even if they make mistakes, and that really helped advance the project.

The intervention was multi-faceted. As you saw we offered several different kinds of clinical decision support. There was a little bit of something for everyone. People weren't forced to use anything. If they liked the order set, they could use that. If they preferred the template, they could use that. Some people relied more on the feedback and the discussions that that engendered. So people could use what they liked and things that they didn't find so helpful they could skip. They were flexible. We did make changes along the way. And, as I said, because we didn't compel people to use anything they were really able to use it in a way that worked best for them. And the combination of the different tools in the system as well as the training, the policies and procedures, and the data that they got back really created an overall heightened awareness to hypertension which we think just created a buzz and made people think about it more maybe than they were before. The system was implemented to work with the workflow so there was nothing to click around. You did not have to provide a justification for not doing anything. There were no speed bumps. There were multiple ways of accessing information so you could get a template in more than one way depending where you were in the EMR. And so we found that it really did not interfere too much with providers managing their patients from a workflow perspective.

And finally, we find that system stability and reliability is a major success factor. And we did have challenges with this. The clinical decision support features did require more processing power and if the system slowed down or worse crashed when providers were trying to do something with it, obviously that was a major barrier and it took a lot to get people to go back and try again. So we did beef up some of the technical infrastructure to support it with servers and bandwidth, etcetera, but certainly the performance of the system remains a critical success factor. And I think with that I will turn it over to Angela.

ANGELA LAVANDEROS: Thank you. We will have questions and answers at the end. Our final presenter is Dr. Cebul who will present his results from a Learning Collaborative for Quality Improvement. The collaborative included seven hospital systems with 500 primary care physicians caring for 70 percent of the chronically ill patients in a large Ohio county reporting care and outcomes with chronic diseases. Dr. Cebul, the floor is yours. Dr. Cebul, are you still there?

DR. RANDALL CEBUL: Yes. I'm sorry. I think I re-muted myself.

ANGELA LAVANDEROS: No problem. The floor is now yours.

DR. RANDALL CEBUL: Am I on?

ANGELA LAVANDEROS: Yes.

DR. RANDALL CEBUL: Randy Cebul here in Cleveland. I actually just reviewed my slides off line here, and I think I'm going to skip a little bit of this, but basically what we're doing is we did a cluster trial supported by AHRQ in 2005 through 2008. And the results of this trial eventually led to a regional EMR based quality improvement collaborative. And I will skip the first part of the AHRQ trial which basically had to do with the design using the EMR to design the trial. We published something on that in the April issue of the Journal of General Internal Medicine in 2008 and move a little bit to the clinical decision support tools that we tested, some lessons learned from that trial, and then how we used the experience that we had in the AHRQ trial to really sort of go large in the greater Cleveland area.

Now let me see if I can move this. Okay. So the objectives here to describe how this AHRQ funded trial led to a region wide EMR catalyzed quality improvement program. The AHRQ trial we call DIG-IT for Diabetes Improvement Group Information Technology. And the Johnson Foundation program is called "Better Health Greater Cleveland" or just "Better Health". So I will walk through these projects in succession.

The goal of the DIG-IT trial, the AHRQ funded trial, was to determine the effect of an EMR based clinical decision support system on the care and outcomes of adult diabetics in two healthcare systems. We used ADA or American Diabetes Association measures for care of which there were five, and outcomes of which there were five. We created then composite scores, and we did a cluster trial. And we compared the clinical decision support tools practices to usual care and stratified by insurance and also looked to see whether or not the effects were similar among established patients versus new to system patients.

So this first part is basically summarized best in the JGIM article in April of 2008 and how we used the data to establish comparable clusters of practices to assign to either the intervention or the control group arms of the trial. So after assigning them either to intervention or to control, we then flipped a coin and assigned the groups to one or the other. This slide basically introduces illustrative components of the clinical decision support intervention, filtered alerts, and linked orders similar to what we've heard earlier and not dissimilar at all to what Helene described here. We provided weekly performance feedback, and there are a number of other tools, but I'll just show a couple of them.

This the vendor used here is not eClinicalWorks as Helene talked about, but Epic and we created the tools within Epic. In Epic alerts are called Best Practice Alerts. And here what

we have is an encounter based alert. This alert pops up and it's filtered to minimize false/positives. In other words, we've got an alert here that says consider prescribing an ACE inhibitor or an ARB medication because the microalbumin is 30 or higher in a diabetic. And you've got a number of attributes of the patient in terms of prior tests that are part of the visual display of the alert. And what we know about this patient is that she has diabetes and is visiting her primary care doc because that's where the alert is triggered. Her kidneys are leaking protein that you can tell that from within the box under the yellow bar. She has no other contraindications to being prescribed an ACE inhibitor because her potassium is normal and her creatinine or kidney function is normal. She's not on an ACE inhibitor or an ARB, and she has no documented allergies to them by pulling from the allergy list and the medication list. And there are several alternative drugs and doses. And you get to the alternative drugs and doses by clicking on the links to the automated order set similar to what Helene showed with regard to the hypertension project that she reported.

This is something that we produced outside of Epic but was linked into Epic, and this is a comparative performance report that was updated weekly for all the diabetic patients of a given doctor, in a given group practice, in a given system. And so you can compare in this case my diabetic patients in the red oval up to the left. It says My Diabetic Patients versus all MetroHealth System, or MHS, adult diabetics. You see that this doctor has 101 diabetics, there are 6,200 other diabetics, and the case mix of this doctor's practice versus all the other doctors' practices within the system can be compared by looking at those rows. And then there are these profiles which basically include down the rows the goals or the American Diabetes Association attributes that we were reporting on, hemoglobin A1c values, LDL values, Non-smoking, Proteinuria, an on and ACE or ARB, eye examine within a year, and so forth. And the blue bar in each pair is the individual doctor's performance as compared to the dashed bar which is the rest of the system.

So this was updated each week and importantly we actually got data at the data management center for this project from a very large healthcare system within town which was the other side of the trial. So we got data on probably 15,000 patients and 120 docs every week, and produced these performance feedback reports, and sent them back to them in order for them to integrate them with the reports to individual docs. So these were updated on a weekly basis.

The answer here in terms of what is the effect, what is the multivariate odds ratio looking at differences between the CDS group versus the control group. For the entire sample for the entire group that was being compared to CDS to control and then for the entire sample in the care composite on the left, the outcome deposit on the right, and you see that there was a borderline significant difference in care among the CDS group and really a non-significant difference in outcomes between the CDS group and the control group. Among those who were newly established with the system, the care performance was much better among those in practices that have the CDS and really there was no difference in outcomes, once again, between the CDS group and the control group.

The lessons that we learned here I think are important and took us to the next step in our trajectory. First in a cluster randomized trial it's difficult to control other organizational interests in order to maintain cluster randomized study integrity. The project was designed as a two system study and it became a one system study. And it became a one system study principally because there was a personal health record component in the other system that we were planning to randomly assign to practices over the two year period of this trial. And commercial and other related interests of this other system prevented us from retaining the integrity of the study design over the course of the trial.

And I would just say this is probably a generalizable lesson. If you can anticipate what kinds of things you can hold steady and hold constant during the course of a trial and those in which you clearly have control over intervention, it would be well worth it to think in advance about what you can control and what you can't control. The second is the conventional clinical decision support as those described principally by Helene and me and not Jim, Jim actually had a patient centered tool as well. But most clinical decision support is a tool for providers. And the effect is greater of this CDS for care than for outcomes. And outcomes especially in the disadvantaged populations that Helene reported about and that I'm reporting about here as well basically requires patient engagement and family or community level support and other resources that sometimes these patients don't have. So you can get physicians and providers to do the right things more easily with clinical decision support than you are able to make a real difference in patient outcomes if they are in challenged environments.

One of the questions that we asked at the end of this trial was whether or not the providers wanted to keep these tools alive and well within the system, and the answer was yes uniformly. About 95 percent said yes keep every individual tool alive and well. And so we have although at the end of the day it was not clear whether the effort required would be worth the return on investment.

The last lesson learned here is that cross-institutional studies require trust. And Reed Tuckson, who I think is Chief Medical Officer at United Healthcare now, a long time ago said, and I remember this well, that trust trumps technology. That you could have all the technology that you want and if there is not trust across organizational partners or would be partners that large scale projects of this sort just aren't possible. And I would say that even though in this case the second partner couldn't fulfill all of the obligations with regard to the tethered personal health record, that there was a lot of trust that was engendered in this that then led to the current activities that we're engaged in.

So in terms of building on our DIG-IT experience, we then went to a region-wide electronic medical record catalyzed collaborative for quality improvement for chronic conditions. So in addition to focusing on Diabetes we also have added hypertension and we have added heart failure. We publicly report our results twice yearly. It's on a website, and the results are reported in a convening session for the Greater Cleveland Community. We are not using insurance claims for this purpose. We are simply using practice based data. We are sharing best practices in the EMR adoption and Meaningful Use. We have learning collaborative summits where people attend, and learn about how

to use registries, how to use alerts, and automated order sets, and panel management, and so forth. And we have practice coaches that support the practices in doing such EMR based Meaningful Use.

We're part of a national network that is called the Aligning Forces for Quality supported by the Johnson Foundation. We're one of 16 sites that are part of this signature program of the Johnson Foundation. This slide essentially shows the practices that are on a Google map that you can hover over any one of the balloons and look at the attributes of the practice in terms of its hours, its providers, and its performance and compare them to any others that you like. This is a table that essentially shows the results that we're actually going to report next week with regard to the populations and the practices that we're serving. We're reporting on Diabetes to the left, High Blood Pressure, and Heart Failure. Collectively there are 120,000 unique individuals who have one or more of those conditions in 48 clinical sites of eight health systems. The variation in the health systems in terms of insurance, in terms of race, in terms of income, and high school graduation rates in those red rectangles below is really quite remarkable. So that we have practices such as Helene's that are federally qualified health centers that care for patients who live under bridges and are homeless as well as practices of let's say Kaiser which in our region does not include Medicaid and certainly doesn't cover the uninsured. We've got quite a bit of variation across practices.

These are the learning collaborative summits. We're always trying to recruit new practices to participate and publicly report. We share the experience of new adoption. The person at the microphone standing up is the Chief Medical Information Officer at MetroHealth where I am. And the folks who are sitting at the table are all from Safety Net Practices in the community that have just undergone adoption of electronic medical records either Epic, or NextGen, or Centricity, and they were sharing their experiences with others in the audience.

These are the standard for Diabetes and Hypertension here. We also do heart failure as I mentioned. This slide essentially shows and this is all of calendar year 2010 demonstrates in a bivariate way how do electronic medical record practices do in the care and outcome of Diabetes on the left, or in High Blood Pressure achievement on the right by comparison to the orange bars in each set of pairs which are the paper record systems. And the differences are obviously dramatic in Diabetes, and they're pretty substantial as well for Hypertension. This 72 percent control is the region wide percentage of hypertensive patients that have blood pressures of 140 over 90 or less leads me to think that between Helene and all of our partners in the Aligning Forces site it would be good to motivate one another to improve in the care and outcomes of common chronic conditions especially where metrics such as 140 over 90 are really pretty widely accepted.

In terms of the care and outcomes of Diabetics for 36 sites that have reported each time since early 2008, these have improved consistently over time and rather impressively over time. And here what we have on the horizontal axis improvements in care to the right and on the vertical axis improvements to outcomes in Diabetes, 33 of the 34

practices in this slide that have reported each time have improved in either care or outcomes or both, and only one in the lower left corner had declined in both. So then the question becomes and from our point of view the issue nationally has become what should you expect from Adoption and Meaningful Use of health records especially in practices that are serving disadvantaged or vulnerable populations and community health centers. Should we expect to get a return on the federal government's perspective? And so this is the paper that... Actually I saw Helene at the Academy Health Meeting in Seattle last week so this was presented at the Academy Health Meeting a week ago yesterday. So the question asked is what difference does electronic health records make in the context of a regional collaborative?

So we set out to compare achievements and trends achievement in care and outcomes in EMR and paper based practices for adult patients with diabetes overall and stratified by insurance type. In other words, maybe EMR's are helpful for Medicare, commercial patients but not for Medicaid or uninsured patients. Maybe we only improve care and don't improve outcomes. Are there any dominating individual metrics that may be benefited by electronic health records?

So this is in a Cuyahoga County near Cleveland, Ohio where we report a cross-sectional look at 2009, 2010 of 27,000 diabetic patients cared for by 569 docs in 46 practices of seven systems. And then we also look at trends and achievements for fewer patients for 36 sites that reported every period. And this is just the analytic approach. If people have questions, I'd be happy to answer it. But we did do a secondary analysis here that was restricted to Safety Net practices only because they are more likely to consist of the priority primary care providers who are being supported in EMR adoption and meaningful use by regional extension centers across the country.

So here what you're seeing on the left hand side on the vertical axis is this is the difference in achievement in care in the left bar of the first pair the difference in achievement in care between patients in electronic health record practices versus patients in practices that use paper medical records. Thirty-five percent more patients achieved all of the care standards in the EMR based practices as compared to the paper based practices after adjusting for age, sex, race, income, educational attainment, and language preference. Fifteen percent more on people achieved the outcome standard in the EMR practices than in the paper based practices. If we look by pair whether it's Medicare, commercial, Medicaid, or uninsured everyone did better in the EMR practices than in the paper based practices. On the right hand side outcomes, again, we better in the EMR sites than in the paper sites. There were no dominating benefits here, and in fact there was better performance on all of the care standards and all but one of the outcome standards, A1c, Blood Pressure, LDL, Non-smoking, all were better in the EMR based practices.

This is a trend analysis which basically says what percentage improvement is there per year, and again it's the difference between EHR's and paper practices. And there was ten percent better care per year in the EHR systems and four percent better outcomes per year in the EHR systems and this was similar across all pairs except for outcome in the Medicaid group.

So in summary of this regional collaborative that was built on the trust of the AHRQ trial, EMR's were associated with better achievement, faster improvement across all pairs, across all care standards and most of the outcome standards for adults with Diabetes in the context of a regional health improvement collaborative.

The last slide here is what we're learning. Increasingly I would say that the providers, the employers, and health plans are all recognizing the values of electronic health records. And they're especially appreciating the fact that practice based measurement and reporting is granular, it's timely, and it's actionable. And then I guess trust builds from technology. We couldn't be sharing these data if there wasn't confidence and good relationships across organizations and trust that we are trying to be the rising tide that floats all boats as opposed to identifying outliers who shouldn't benefit from, let's say, paper performance incentives of the health plan. So I will stop there and take any questions that people have. Thank you.

ANGELA LAVANDEROS: Thank you, Dr. Cebul and all of the presenters today. With that final presentation that concludes the presentation portion of today's national web conference. So again thank you to the presenters and to everyone who's joined us and participated in today's call. We're now going to move into the Q&A, question and answer, portion of today's call. So at this point if you haven't already I would encourage anyone who has a question to go ahead and submit them now. We do have the first question in and that is posed for Dr. Friction. Did you notice that using the guidelines changed the daily practice? That's the first question. And then it says would this change the need to access the guidelines?

DR. JAMES FRICTON: This is Jim. Yes, we did find that the dentists who accessed the guidelines did change their behavior. For instance, they scheduled patients with more dental hygiene visits. They actually changed the chart in order to highlight the fact that this patient had a chronic condition and needed to have changes in the guidelines. We also found that the patients had an improvement in outcome in general too. Although this was not as significant as we had hoped it would be because of the quality of the care that was provided by dentists was relatively high and were relatively consistent with the guidelines currently. So even though they accessed the guidelines we felt that there was improvements in changes in behavior by the dentists and to some extent the dental hygienists, but we didn't see as much of an outcome. But we're still analyzing that data to look at different types of outcomes.

ANGELA LAVANDEROS: Thank you for that. The next question that comes in is for Dr. Cebul. What kind of resources are needed and who pays for DIG-IT? Is there a way of looking at data like this sustainably without grant support?

DR. RANDALL CEBUL: DIG-IT was funded by AHRQ so we got a million and a half dollars back in 2005 as one of the value grants and so it was funded exclusively by AHRQ. The more current project, the Better Health Greater Cleveland, is part of a large and huge \$300 million investment by the Johnson Foundation over a period of eight

years. And so although that sounds like an enormous amount of money, the amount of money that is actually going to the sites as opposed to the technical assistants is relatively modest. So we got \$600,000.00 for the first three years of funding from the Johnson Foundation and now have an annual operating budget of about a million and a half that is local foundations, hospitals, providers, and insurers, and purchasers of healthcare who have joined as membership sort of supporters of this program. So the first piece was grant supported by AHRQ. The second piece started as a Johnson Foundation funded initiative and has evolved into a multi-stakeholder membership, sponsorship, services kind of organization.

ANGELA LAVANDEROS: Thank you Dr. Cebul. Actually the next two questions are for you as well. You said that the CDS program has continued but that it was not clear if the effort is worth the benefit. Given the changes in clinical practice were significant, the changes in outcomes were not material, how do you measure benefit?

DR. RANDALL CEBUL: The cost was really the cost of our programmers to do the updates every week, and they were willing to do that. The benefits were that the providers all wanted them and now this is now three years later, almost four years later, since the trial ended. We're in a new environment where there is actually the Better Health Greater Cleveland kind of thing where there's regional sort of competition if you will in performance, and there are health plans and others that are supporting practices that do better. So we were glad that we kept it alive, although it was not totally trivial in terms of the regular monitoring of data that's required to insinuate the reports and so forth into the medical records. I hope that's responsive.

ANGELA LAVANDEROS: I think so. The next question is for you as well and there is a reference that is cited to the archives of internal medicine in 2011. It says given the recent findings that CDS doesn't show improvements in quality indicators, how do you interpret your findings to explain this? For example, the presentation showed a difference in care versus outcomes. And what recommendations do you have for practices to effectively use electronic CDS to improve quality outcomes?

DR. RANDALL CEBUL: Well I guess two things. One, stay tuned; look for counterfactual kinds of results. And second I would say that the results that I showed from this regional collaborative really there's a very intensive effort to one, to have everyone in the region agree that these measures are important. We use National Quality Forum standards, vetted them locally, and said these are the ones we want to win on. These are the ones we want to improve, and then we supported practices to do better. And so I would say that in the context of a regional health improvement collaborative, EMR's have become very valuable tools. It's like you can't be a master craftsman just because you have a great workbench and all the tools. You probably can't be one without one, but just because you have a workbench and all these tools doesn't make you a master craftsman. You have to be taught the tricks of the trade and that's what we're doing in the regional collaborative. I would say with regards to specifically to Romano's paper and others that have used the national survey data, you're basically with a very broad stroke saying if you had any kind of electronic health record in any region of the country and

you were using any kind of clinical decision support, you should do better on these specific metrics that they laid out. And I think that was an unfair test of the potential value of clinical decisions to support an EMR more generally. So I basically think that that... And I frankly think that in context of the federal outpouring of dollars to help especially more vulnerable practices and patients getting electronic health records, that it's unfortunate to have people be a little bit more cynical or nay saying than, I think, is warranted. I think we need to be critical in this context because in 2004 we were told by George W. Bush that we were going to be all connected in 2014. Nothing happened until 2010. So I actually think that I would push if people used those recent citations as evidence that electronic health records aren't worth it; personal view.

ANGELA LAVANDEROS: Thank you. One question that has come in that I just want to make sure is okay with all the presenters is it okay to give your e-mail addresses out if people would like to contact you further?

DR. RANDALL CEBUL: Oh, absolutely.

DR. JAMES FRICTON: Yes, of course.

HELENE KOPAL: Yes.

ANGELA LAVANDEROS: Okay, great, thank you. We do have another question. Dr. Cebul someone mentioned they may have missed this but was there more than one (inaudible at 1:20:08) involved or was this Epic across the sites?

DR. RANDALL CEBUL: At that point in history it was Epic across the sites in terms of the DIG-IT trial. In the current environment we now have added NextGen and Centricity, and actually we're hoping to engage some folks that are using eClinicalWorks. And I have a question for Helene and that is how easy was it for you to tailor the clinical decision support, and the automated order sets, and so forth in the eClinicalWorks environment?

HELENE KOPAL: It was pretty easy.

DR. RANDALL CEBUL: Did you do it or did they do it?

HELENE KOPAL: The clinicians did it.

DR. RANDALL CEBUL: So they did it. So the vendors didn't do it the clinicians did?

HELENE KOPAL: That's right. And at the outset of the project we actually envisioned having the vendor drafting specifications and asking the vendor to make the changes that we identified. In the interim they had a new release of the software which included highly customizable features where you can craft templates, order sets, value ranges for alerts and alike. They're very user friendly. And in the end we decided to go with that; one because it was, frankly, easy to do and we didn't think we'd get the kind of support in the

timeline that we needed to do programming. And secondly, this health center is really the environment that many health centers have. And most health centers are not going to be able to have customizations. So we really wanted to use the features that were available and the customizations that the software provides really enabled the health center to build the application almost. I would say we were probably able to implement about 90 to 95 percent of the features that were on our wish list.

DR. RANDALL CEBUL: Terrific.

HELENE KOPAL: It was really very user friendly and a fairly smooth implementation in that regard.

DR. RANDALL CEBUL: Thanks. So do you have a group of super users?

HELENE KOPAL: Yes. There's a physician super user. This health center is fortunate enough to have a director of quality improvement which we're seeing a little bit more of. Who are that super users? They not only understand the front end but also the data structures and the back end.

DR. RANDALL CEBUL: So this is the kind of thing that if you're in an environment like I am and like you are, obviously, you can get the super users to help create other super users who can create templates, automated order sets, alerts, registries, etcetera that they want?

HELENE KOPAL: Yes. You mean within this single organization?

DR. RANDALL CEBUL: Yeah.

HELENE KOPAL: Yeah. You absolutely could do that.

DR. JAMES FRICTON: That's true in HealthPartners also is we have a whole programming crew that have developed decision support software in a variety of conditions and leveraging that has been very helpful. However, translating that into the broader community has been more difficult to do, and something we want to do at some point, and that's where we're involving the health information exchanges to get data back and forth.

DR. RANDALL CEBUL: Right.

ANGELA LAVANDEROS: Okay, thank you. I have 12:56 p.m. Eastern standard on my time so I think I have the last question. This question comes in how did you determine the sustainability strategy, and how did you roll it out to potential subscribers?

DR. RANDALL CEBUL: Was this to me?

ANGELA LAVANDEROS: This is I believe this could be applicable for the entire group. It's not posed to any particular presenter. So anyone that would like to weigh in for this final question, the floor is open.

DR. RANDALL CEBUL: Well I can answer for us and that is we thought about this from the beginning of the Robert Wood Johnson Foundation funding. We got into the Johnson Foundation program because they were invested in it for a long period of time. But they also said that as of 2015, they were not going to be in the business anymore. And so as the program grew we wanted to be able to wean ourselves off of foundation support and engaged some consultants to help us review models that were available elsewhere in the country for this sort of thing. And we came up with a model that was essentially a membership model. So if you want your practices reported you pay some dollars. A sponsorship model, the learning collaborative summits are supported by health plans and others. And a services model, if you want to improve your Meaningful Use of your EMR we can provide services that would support your doing that. So we came up with this membership, sponsorship, services model based on some homework that we'd done. That's a good question, very good question, very tough.

ANGELA LAVANDEROS: Would anyone else like to answer that question?

DR. JAMES FRICTON: This is Jim. Yeah, that is a very good question and it's difficult to do. Sustainability within a health system or within a health organization is easier to implement because there is some advantages, particularly an HMO, some cost advantages to implementing decision support. However, in a clinical private practice setting where the profit is closer to neutral it's difficult to have the added service cost of adding decision support into their electronic medical record systems. And so we found, and particularly dental practices are very difficult to add that in, and many of the vendors are moving in the direction of adding decision support because the practices and clinicians are asking for that. But it's still more difficult, and it's expensive to implement electronic health records. The vendors are also relatively slow about implementing them because they're implementing in broad scale with a high quality. So our strategy has been focused primarily on doing the research to develop the tool, and demonstrate its efficacy, and then develop strategies which usually involve the health information exchange organizations to implement that software now to take data from different clinical practices. The health information exchange organization then has a membership similar as well as a service charge to be able to download or implement software from their cloud technology that they have. And in that way the software stands independent of the electronic medical record to some extent but interfaces to the record system. So it's still in evolution. That's a good question.

HELENE KOPAL: And I'll just add from the health center perspective briefly that it's really for many settings a resource issue. And it's just always a challenge to allocate resources to improvement projects when many places are really challenged just to meet the daily needs of the patient. We hope that the work that we did in this health center has established a competency among the staff in terms of as we discuss making the changes in the EMR, as well as doing the data analysis, and the other changes that they need to

make to accommodate the clinical decision support, and that they can continue it on. I think that a lot of the factors that led to the success of this project are the factors that lead to a sustained improvement; the leadership, the focus, the resource allocation, and sort of the sustained desire to see improvement, to work the patient list, and to really identify what the barriers to care are, and to identify solutions. But it's true the resources required to launch and to sustain these kinds of projects are significant, and it's a challenge.

ANGELA LAVANDEROS: Okay, great, thank you. Thank you to all of our speakers today for their excellent presentations and to all the attendees today who participated today and asked great questions. With this, this will conclude our web event for today presentations, audio recordings, and written transcripts will be posted to the AHRQ website at www.healthit.ahrq.gov in approximately two weeks. Thank you.

MODERATOR: And attendees you'll also be receiving an e-mail with instructions for submitting for your CME certificates. The instructions are also actually on the credit tab right above the viewing screen right now. Again, thanks very much for joining us today. We hope everyone has a great afternoon. To end this call, simply hang up. [1:30:08]

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