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**The 15th Princeton Conference: Can Payment and Other
Innovations Improve the Quality and Value of Health Care? -
Day 2
Council on Health Care Economics and Policy
May 29, 2008**

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CHIP KAHN: ... full session, we will end up later this afternoon with wrap up by John Iglehart and wrap up by Stewart Altman at the very end, but last subset of session is on IT and we have two very interesting individuals to discuss that issue. Before I introduce them and I will be very brief in introduction so we can get moving, I just wanted to make a couple of points and take a moment to do that.

I have spent the last two and a half years on the AHIC, the American Health Information Community which is a commission of HHS that Secretary Levitt setup on IT, and actually, I think a lot of progress has been made both in terms of promoting the entities that are setting standards and generally building interest and focus in the area and focusing on a number of the big issues. Although, I think, whether and how we get to interoperability, and whether or how even regardless of that, we get most providers and physicians plugged into something for their patients, I think, I think is still unsettled although I must say both in visiting one of the institutions that will be represented - actually in visiting one of the institutions to be represented at the moment - Presbyterian.

Also, in experience I have had with the VA and some other experiences in looking at systems, one thing that is always - it really is thrilling to me about institutions that

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have made progress with electronic health records is that they discover things. It is not the information they knew they would have for better care for the patients, what is interesting to me is the information and the care and the data regarding care of the discoveries they make about things that they did not otherwise know or never thought they would have gotten from the fact that they now have data arrayed on patients in a way that was never arrayed before.

And what strikes me about it is that and I am sure it would be through across institutions but this just comes from these VA or Presbyterian, or others you having these now data bases of their own. I mean, being able to look at their own data and what strikes me is that they are very specific aspects of care in this case primarily in hospitals that has been affected by something being available that was not available just a few years ago.

So, that on the one hand is very thrilling to me and I think maybe one of the best things that we will get out of IT. Let me also say though and I will go back to being a small businessman for a second. I have 15 employees. I service around 22 companies as members, and a few years ago, we decided that we really wanted to move our computers - our servers out of the building so we only had an office manager who did the work. We always had problems so we were going to get a big

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utility to handle everything.

And Monday - Tuesday, at the staff meeting, my personnel handles the management came back and said, "Well, the latest idea from our off-site entity that took us a bloody year to sort of get to a point where we even had stability in our messaging much less membership in everything else was the idea, that gee, would not they service better if we had a server in the office?" And that is on top of the new membership system that was supposed to go into effect last July and I am hoping we will go into effect some time this July, or the Web site that we are going to announce at the March - the new Web site, we have a Web site - the new Web site that we are going to announce at the March meeting that now is up in the air.

And the only reason I point that out is because the membership processes, the other processes we have are a lot simpler than a small group practice of 15 physicians who probably have about five or six nurses and maybe an office manager would have to put up with if they are going to put a system in for all their records that would really count, not just a bunch of email and some issues about whether or not somebody paid their dues.

So, I think that this is not a simple prospect and is going to be much more difficult than any of us would hope but I think we are going to hear a lot in the next few minutes about

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the possibilities of this and I look forward to Paul Shekelle first who is consultant at RAND in Health Sciences and also a professor at UCLA School of Medicine and a staff physician at the VA Hospital in West, Los Angeles. Then, he will be followed by Dr. Steve Corwin who is Executive Vice President and Chief Operating Officer of New York Presbyterian Hospital and both of them have extensive experience in using systems, understanding them, and I look forward to their presentations. Thank you.

PAUL SHEKELLE: Okay, thanks very much. As he said, I am Paul Shekelle from the VA in West, Los Angeles, and also at RAND Corporation. And so, I will be talking about HIT and the evidence on whether on it is going to improve quality and reduce cost.

First, let me talk about what I am going to mean by HIT in terms in this talk. Obviously, what the term is brought as HIT, it can mean anything that is technology that processes information and it can include back office functions like billing and telehealth and things like that, but I am not going to talk about those today, I am going to be talking mainly about HIT functions that are involved directly in clinical care, meaning, the electronic medical record, computerized physician order entry and decision support systems. Of the three of those together usually being the bundle that is

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considered to be the minimum requirement from multi-functional HIT system.

So, what I want to talk about is I want to talk a little bit about what I believe the requirements are for a successful HIT system. Then, our review of the effects of HIT on cost and benefits that we published in 2005 in the Annals of Internal Medicine, we have just completed a new update of that review that takes it up through 2007, something about the lessons learned from implementation and then looking towards the future.

So, in terms of HIT, what is an HIT system? Well, here is the thing that most people think about when they think about what an HIT system is - it is the computer, it is the software. When you read any of the published articles about HIT, they shown you screenshots over and over again of what a computerized reminder looks like or what the CPOE order entry field looks like.

So that is the thing that most people think about when they think what is HIT. But that is not all there is, I mean, there is also the human factors, right? Can you use this thing? How well is it supported? What about management? How is management involved with it? And lastly, organization and the culture, I mean, is it a place that has an organization and culture that is open to innovation? How does the HIT system

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actually affect the organization and culture?

In 2005, under a contract from the Agency for Healthcare Research and Quality, our Evidence-Based Practice Center was asked to review the published evidence on the cost and benefits of HIT. At that time, we identified 256 studies that supplied us information. As you can see, most of them are about decision support with then additional electronic health record and computerized physician order entry, those being by far the three most common types of functionalities which are reported on.

Inpatient and outpatient and some other sources, but a little bit more outpatient than inpatient. Importantly, we did not limit ourselves as most of the Evidence-Based Practice Center reports are to clinical trials because we felt that clinical trials were not certainly the only or possibly even the best way to assess the implementation of a complex intervention like in HIT systems. We looked at data from many, many different types of study designs.

One of our first important findings was that a quarter of all the studies that had been published come from just four institutions which we call the HIT leaders - Intermountain Health, Veterans Affairs, Reagan Streif [misspelled?] Partners.

And if you look at the higher quality, methodologic studies, the disproportion is even greater. This place has

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probably count for a third or even a half of all the highest quality studies.

At those institutions - at those HIT leader institutions - there is real evidence that this has made a big difference in terms of quality. For instance, that partners, and this is something across several different publications from Partners.

Introducing CPOE has been associated with the 24-percent reduction in redundant lab tests or 86-percent reduction in serious medication arrears, 21-percent increase in ordering the appropriate test, and a 38-percent decrease in time until treatment was ordered. These are just some examples.

At Reagan Streif, which is more about, I mean, Partners does a lot of CPOE, Reagan Streif does a lot of clinical reminders. At Reagan Streif, the clinical reminders there which are then implemented on top of an existing electronic health record, numbers like 10-percent to 20-percent increase in screening and prevention, 10-percent to 20-percent increase in rates of advance care directives and standing orders, computer-generated or computer-based standing orders for nurses, even more effective than physician reminders at improving vaccinations.

At my own institution at the VA, the VA's now pretty well-known for its HIT system. This particular article I can

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commend to all of you if you want to read about sort of what effect HIT has had on the VA. This one is in particular relation to diabetes but I think it is in general true for all the chronic diseases that the VA deals with, this was in health affairs a couple of years ago.

These are the kinds of things that the HIT system makes possible within the VA. For example, in diabetes, it allows you to trend all your patients over time. So these are the hemoglobin A1Cs of everybody in the VA that has diabetes. Both the total hemoglobin A1C which is this line, and then broken out by different age groups. It allows you to get a snapshot to see what is going on in terms of this intermediate outcome over time which shows this general trend downwards with a hiccup here or there over this two year period.

As another example, through the clinical reminders that are implemented through the HIT system, you are able to both remind and to monitor processes of care for diabetes. So, this is over time - this is the hemoglobin A1C. Here is the visual inspection of the foot. Here is the sensory exam of the foot. Here is the eye exam of the eye. This is over a nine or a 10-year period and it shows this increasing performance on all these various clinical reminders.

At the HIT leaders, these multi-functional EHR systems, I think there is good evidence is that they have made a real

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difference, okay?

But in 2005, there was very little evidence, very little published evidence about the cost and benefits at HIT systems at places other than the HIT leaders. In specific, of the 15 trials, either randomized or controlled clinical trials that also reported evidence on cost, none of them assessed an HIT system that was multi-functional. These are usually standalone decision support kinds of systems. Forty-five other hypothesis testing studies, that was our moniker for things that were not in trials that also reported cost, again, none assessed the system with broad functionality.

So that as of 2005, there was no published study, no published hypothesis testing study that reported benefits and costs of a multi-functional EHR at anything other than the HIT leaders.

These left people with the following problem. Okay. Here the HIT leaders hear. Here are the characteristics that they share. These are all locally developed systems, developed over many years, usually in some kind of symbiotic or co-evolutionary relationship with the care delivery system. They have local champions, who are frequently also the developers of the system, the implementers of the system and the evaluators of the system. They have definitely delivered real benefits but again the costs are questioned because these things have

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been developed incrementally over decades, sometimes with research grant support, sometimes with hospital support, sometimes in the middle of the night, however it is, and trying to figure out how to aggregate those costs overtime is a real challenge. This is where the HIT leaders sit. This is where the rest of the community is sitting. You are going to be essentially buying a commercial HIT system and you have no evidence based upon which to make it that is in the published literature.

This is a quote from Trish Greenhalgh, kind of sums up what the problem is, "Context and confounders lie at the very heart of the diffusion, dissemination and implementation of complex innovations. They are not extraneous to the object of the study. They are in fact an integral part of it." So, when we look in 2005 in terms of the types of contextual information that people might want to know about an HIT implementation, we found the following. Only three studies provided information about the institution's financial context. This is despite the fact that the most influential decision analysis about the implementation of CPOE has as its most important variable about the return on investment in terms of CPOE, the financial context of the institution.

Six studies provided information about system penetration, one study discussed facilitators, one study

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discussed sustainability, six studies reported initial cost and nine studies reported implementation costs. There was a very thin database about the contextual information that you want to know if you a rural hospital in Nebraska or an urban inner city hospital in Chicago in terms of HIT cost and benefits.

There were some reports in the non-peer-reviewed literature that not every implementation perhaps was successful. This was from January 2003. "Cedars-Sinai Medical Center in Los Angeles has indefinitely use of its computerized physician order entry system after hundreds of doctors complained it was difficult to use and compromise patients safety." the Los Angeles Times reports, "Cedars-Sinai introduced the customized system in October 2002 in response to a state law that requires hospitals to adapt plans to reduce medical errors by 2005." This one from 2007, "Repeated technical problems of hampered Kaiser Permanente 4 billion efforts to computerize medical records and has led to potentially dangerous incidence involving patients according to a published reports citing hospital documents and current and former employees. Kaiser Officials acknowledged the digital effort called the Health Connect had technical challenges but they say those of now have been resolved and patients should feel safe getting care at any Kaiser facility," the Los Angeles Times reported Thursday.

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Now, neither of the full stories of these has been published in the peer-reviewed literature, perhaps for obvious reasons, and so maybe there is more to this story than what the LA Times has reporting. But these kinds of things do percolate through the non-peer-reviewed literature to suggest that not all implementations are successful.

What has happened in the last couple of years? Well, we were commissioned by the Health Foundation in England to do an update of the cost and benefits of HIT. We basically replicated our 2005 work and brought it up to 2007. What we found was, again, the most common functionalities that had been published are going to be CPOE, electronic health records in decision support, but I want to call your attention to this. So now, there are 21 studies of patient decision support, things that are directly coming into patients, and a little bit more on electronic communication and mobile computing. Again, the hospital inpatient and outpatient ambulatory settings dominate, but 18 studies now are designed for patients to be accessing these things through home or their Internet. Again, a broad range of study designs.

Here are the general themes of our 2007 update. First off, we found more articles than we were expecting to our disappointment given the budget that we had to do this update.

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[Laughter] The HIT leaders, they continue to publish and they continue to publish a lot. They are refining their applications. Descriptions of commercial HIT systems are a little more common than they were and I will discuss that in just a minute.

Interestingly, there is an increasing numbers of clinical HIT applications that are designed to work external to any HR. I will discuss that in just a minute. There is a little bit more knowledge about implementation but still a lot to be learned. So, in terms of the commercial multi-functional EHRs, what we found more studies and here is what we found. We found two studies that reported implementing commercially available EHRs, one in Kaiser Systems and one in real family practice in New York State.

We found a study of an effect on the organizational culture after converting to an HER. We found quite a few studies about what happens if you added a new functionality on top of a system that already had a fully multi-functional EHR. Then, we found a couple of weaker associate of studies about community HER use and quality.

Here is an example of the multi-functional commercial HIT article that is in the literature so this article reported the results in two different Kaisers. One in Colorado that had a locally developed EHR but it was in collaboration with IBM,

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and another Kaiser Northwest which implemented Epic care. They both had these same set of package that people considers a multi-functional EHR, and this was a pre-post comparison of before and after implementation. What they find, well, they found an ambulatory care decreased over time and was accompanied by a concomitant rise in telephone context with going from 1.26 to 2.9 calls per member per year. Radiology use initially had a relatively sharp decline followed by a modest rise but overall, in the pre-post period, still had a modest decrease.

They only had three measures of quality assessments - smoking cessation, cervical screening and diabetes eye exams. And they found either no change or perhaps a slight improvement. So their conclusion was that, "We save some money and we did not compromise quality with the implementation of this."

Now, in terms of understanding the successful HIT implementations, probably the best article that has come out in the last couple of years is by John Ovretveit, who analyzed this success of HIT implementation in Sweden. He starts with the notion or sort of the obvious thing that some elements must be critical for a successful HIT implementation and evaluating these elements and some kind of systematic fashion may help you understand why some implementations work and some do not work.

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Starting from theory and Rogers' Diffusion of Innovation and some other things, he assessed how this implementation worked in Sweden, and these were his conclusions based on his findings and his empiric observation that the factors that were important for the HIT implementation Sweden included this.

Well, in the EHR system itself, it was the ease of use, physician acceptance, absence of system failures. You cannot have it crash after you have gone to an electronic record and not have a paper-based back up anymore and then have a crash.

Meeting the clinical and managerial needs in terms of leadership, management support and physician champions. You got to have adequate people to staff it in financial support, you got to be ready for a change, and you have to have user-involvement, a lot of education and it helped to have previous IT experience.

To this week in augment from the VA, Vista - that is the name of the VA's HIT - since I worked in the VA and I worked before, after and during, there is no question. It has transformed all aspects of VA care. But this article in health affairs that I commend you to makes the point that it is not the HIT system alone, or even per say, or even majority. All these other things played a very, very important role. Culture

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of academic clinicians who value quality, a culture of scientific evidence and accountability, health services researchers who are active clinicians and policy makers who help developed Vista, who helped evaluate this, who helped implement Vista, a research infrastructure and very, very importantly, the incentives are aligned. The VA pays for the HIT and the VA is the one that benefits from the cost-savings.

Lastly, for everybody to keep in mind, from that very start of the VA's work in electronic records to now is 25 years. This thing did not happen overnight.

So, well, how HIT improved quality and reduced cost? Well, I think there is good evidence that HIT can dramatically improve quality and safety. I think the evidence for cost-savings is much less-clear particularly around clinical reminders. Remember, they are reminding you to do stuff that you are not doing. The challenges of implementing HIT have been underestimated and poorly studied. Successful implementation is going to take time, resources and leadership. Looking to the future, I expect more successes and failures over the emerging. I think the key to our learning is going to be understanding the things that are other than the computer and the operating system. It is going to be the human factors, the management and the organizational context. I can draw your attention to implementation science such as a journal around

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how to do these kinds of things, and that institutions is interested in implementing HIT should study the VA experience.

Last slide, in terms of the requirements for a successful HIT implementation, I think the number one thing has to be that you have to align the financial incentives. When we look at surveys of barriers to HIT implementation in the US, the number one and two thing mentioned in every single survey is cost and physician acceptance. The problem is that the practices are being asked to bear the cost, but the practices are not the people that are bearing of our garnering some of the savings. Obviously a strong commitment by clinical champions, a faced implementation and the realization to go to a successful transition to an HR is going to take months if not years. Thank you. [Applause]

STEVEN CORWIN: Well, good morning. Thanks for having me here. I recognize that I have a dubious distinction of being the only thing between you and lunch. So, following Oscar Wilde, gravity being the sole of whip, I will try to brief in my remarks.

I want to follow up a little bit of what Paul said. We have a 2,400 bed-system. We implemented a commercially-available EHR over about an 18-month system. I have some scars but I am still here. The physician acceptance is something that I believe our providers are ready for. It is a course

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system for us. It is like oxygen at this point in time. It cannot go down. We have to have reliability 24/7. It is used by all our providers.

Why am I saying this? Because as I talked about the interface between quality and IT, it has become apparent to us at least, that this is not just something that is desirable for the health system. This is absolutely essential.

What you have been talking about this morning and yesterday, it is my contention and I hope to give you some examples of this that we cannot achieve with our providers the improvements in quality that are necessary without IT being a significant enabler of that.

Not only can we actually look at the IT quality interface as to what it can do now, what I would submit to you is that I can show you some examples of how one can start to define quality by this interface.

Healthcare information technology cannot just be used to look at process indicators, to look at certain measurements, be the core measures or anything else. You really have to look at what the system of care is and how one is going to improve upon that system of care. And to that end, I am sure that you would all recognize these things need to provide real-time analytics. We got a support clinical decision making in a real-time way. It must reduce errors. And it has got to

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enable con activity across the continuum of care. All these hand offs, all these potential drops, errors, redundancy in care cannot happen unless the IT systems that we employ really address that issue.

So, to my way of thinking, nurses and physicians will not respond, providers will not respond unless they have a real-time clinical analytics in order to make decisions that can improve outcomes.

What we are looking for obviously in all of our healthcare organizations is high-reliability. I would submit that despite some of the issues with our medical system of care, we have extremely committed providers, we have the best medical training system in the world and we have people who can provide truly unique and innovative therapies across the spectrum of diseases with great outcomes. Nevertheless, I think we would all agree that we have not achieved high-reliability in terms of safety, errors, et cetera.

From my standpoint, if you do not address a number of different dimensions across this healthcare information technology quality continuum, we will have missed the boat. We need to address outcomes. You need to look process improvements. You need to address all of national patient-safety goals whether here to fore-defined or to be defined. It needs to address event analysis including near-miss analysis.

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It needs to address core measures but by no means can core measures be the only thing that we are looking at. That would be just the tip of the iceberg in terms of a high-quality delivery of care system.

We need to look at care improvement metrics, and we really need to - as I have said before - look at the electronic communications between providers across the here continuum. Whether we have large systems, small systems, no systems, everyone's healthcare is not just system-based. People across various systems, certainly in New York, you can go across systems from one day to the next. You have to get to be able to address that set of issues and we have got to address it with an electronic healthcare record that is patient-centric, not provider-centric.

Information technology in this sense then needs to define a quality organization by improving clinical outcomes, supporting decision-making, as I have said before, preventing errors and our view of it is it needs to increase reliability. However one wants to measure reliability and we can talk about that. We are not reliable as providers.

I would like to take you through a few examples. Some that are simple and some were complicated as to how we have looked at this and where you can see some real benefit.

As you all know, the CDC reported about a hundred and

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so thousand deaths due to hospital infections that was in the year 2000. We put in our intensive care units throughout the country about five million invasive lines. In those lines, there is about four-percent infection rate and in those infections, there can be anywhere from a 5 to 28-percent mortality rate.

So, our goal at the hospital was basically to reduce that incidence of infections that obviously has been a national goal and we wanted to reduce those. We have 16 ICUs across our 2,400 beds. We set a goal in '07 of having each of those 16 ICUs achieve at least four months of zero infections.

In order to do that, we used what is called an epidemiology portal. This was a grant-developed product. It enables us to generate automatically potential cases of interest, whether it is central line infections or isolatable conditions. It displays, summarized information from six different systems including clinical and patient registration, eliminates the need for the clinician design into various systems to obtain a relevant data, brings it all in one spot, it structured fields for capturing notes and decisions by the infection control practitioners, it can assist in conducting root cost analysis, it defrays customizable reports as one might expect. It significantly reduces the time for practitioners to gather and analyze data. And it communicates

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between practitioners in terms of where results are. In essence, we have a system that can collect all the relevant microbiologic clinical information on all systems and use it as an analytic tool.

Our results with using this system in central line infections were over the course of the year. Thirteen of our 16 ICUs had greater than four months without a line infection, 10 of 16 had graded in six months without a line infection. We reduced the volume of cultures requiring review by about 70-percent. We reduced the time spent by practitioners looking at these infections by 35-percent and we saved about 300 hours of data analysis and report-generation by using the system.

This is a system that is an add-on to our electronic record which is a commercially-available record. Our view of this is that it is fine to have home-grown systems, but in essence, a national solution cannot be a series of home-grown solutions. We have got to use off-the-shelf products and then put overlays on top of that.

In hygiene compliance, we struggled mightily with this. Despite educational efforts, campaigns, photographs, et cetera, we had hand hygiene compliance rate of between 50-percent and 60-percent pretty much what you see across the country. We decided to do a series of independent observer, mystery shoppers, reviews, we gave these mystery shoppers handhelds, we

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were able to collect and analyze data, be able to develop unit-specific reports, shared best practices and brought every specific patient-care unit together, and we are able to demonstrate their results on a monthly basis.

Over a 10-month period, the hand hygiene compliance went from 55-percent to 90-percent and we believe that that is a sustainable result because the systematics behind this is sustainable. This is not extolling the virtues of New York Presbyterian. I think that these are examples that can be applied across the board and would be successful across the board.

We use Eclipses [misspelled?] as our electronic health record. On top of that, we have developed the patient health monitor which basically is a natural language processing clinical data support tool that can sit upon on top of the electronic health monitor. What we have been able to demonstrate with this particular technology is, earlier, glucose control in post-surgical patients, earlier extubation and bypassed patients, earlier application of infection control techniques in all patients across the board.

So, in essence, this particular technology sitting on top of the electronic health record is able to view the results of the individual, connect that result to a clinical database that contains about two million patient records, compare those

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two and give the practitioner real-time support as to considered this intervention now.

For something like glucose control after bypass surgery as an example, you can go from an average of AAA to get the glucose under control to less than 24 hours by using this technique. Again, it is defining quality. It is using the clinical information available. It is translating it into a real-time practical benefit.

Finally, hand-offs. Obviously, one of the major issues that we have as a healthcare system both within New York Presbyterian and as New York Presbyterian or any provider reaches across various barriers is this notion of hand-offs. I am sure many of you are familiar with SBAR or Situation Background Assessment and Recommendation. This is one methodology that people use to talk about improving hand-off communication. Over the past year or so, we have been able to successfully implement that in our new natal intensive care units. It is not scalable. It is not scalable unless you basically automate the process, and in order to automate the process - it is not rocket science - but you have got to have an emergency department report for inpatient, admissions you have had that shift to shift documentations, you have to have critical value reporting, you have to have know which patients are being referred to the emergency department and you have got

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to use your electronic health record to develop clinical summaries. We are in the process of doing that now and it is not developing something home-grown. It is taking the initial systems that you have, the off-the-shelf systems and using them to develop these hand-off methodologies. I would submit to you unless you do that, whether it is within the hospital or across provider networks, we are not going to be successful. To that end, the Rios [misspelled?] or we participate in one, the ability to transfer patient information from provider to provider across system barriers is as important as these hand-off communications within the hospital.

So, what do we conclude? Policy-level works is just the wired for Health Act which is currently under consideration by Congress as an excellent job of recognizing this potential for information technology and the transport of it, of information. There is other legislation describing the sharing of health across institutions to improve the continuity of care. We support that.

We believe that the examples that I have shown show the technology is critical to improving quality, it is not desirable, it is necessary, it does not have to be home-grown, it needs to be off-the-shelf, but I think that that is achievable and one can do more than just track compliance against certain indicators to demonstrate, improve reliability

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and improve quality across the board. We need a broad comprehensive approach to this. There is just no question, and we have got to insist that what we develop performs real-time analytics, supports clinical decision-making, improves provider to provider communication and automates and reduces the complexity of care processes.

Right now, for me to collect core measure alone, that is a 15 FTE increment in my operating budget. It is not sustainable if all we are doing is just adding measure upon measure and assuming that those measures really represent quality. We have got to do this in a better way.

I would submit that improving quality, increasing reliability is critically dependent upon this, we need a national funding mechanism to get everybody up to speed on this, this is not an issue where the half should do well and the half will not do well. This needs to be something that we address at a national level, develop interoperability standards at a national level, information sharing at a national level and quite frankly, funding at a national level. Thank you.

[Applause]

CHIP KAHN: Thanks to both of you. Let me just check. Stuart, do you want to finish at noon? Okay. We will finish it noon and then we will eat lunch for 45 minutes or an hour?

MALE 1: We need to get back here by 12:35.

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CHIP KAHN: Okay. So, we are going to start now and we will finish in 15 minutes.

STUART ALTMAN: I can agree more with the way you have presented this as showing that HIT is necessary but not sufficient. We did a couple of studies using the tool that we have to sort of assess different functions of having EMRs versus just having EMR, and it was having that versus using it on all the ways that I think Paul laid out. We found no relationship between quality or cost and having an EMR. But having one and using it in the way that you both pointed out, had a tremendous impact and it was only those practice that achieved or could achieved the highest levels, especially in quality and diabetes and cardiovascular.

Do you want to comment on sort of how you might see implementation going? Do you put the systems in and then put the EMR in to support that? You define the system you want and then put an EMR that supports those? How do you make sure that what you have in the end is not an EMR that does not have a registry, that does not do this, that does not do that, and you end up spending hundreds of thousands of dollars programming stuff that should have been there in the first place? There are some EMRs I have seen in the market that were remarkable in terms of their population health stuff at least.

PAUL SHEKELLE: How to do it? I do not know how to do

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it. I can tell you how it has been done. In England, they subsidized. First off, the big hospitals, we have heard the story before. The big hospitals can do this, and the big groups can do this, and Kaiser can do it, and group health can do it, and they all can do it, but that is not where a lot of the action still needs to happen and a lot of the action needs to happen in places that do not have the bodies in the capital to just be able to do it the way these large groups is good.

So, how to get from point A to point B? In England, what they did was they subsidized it. They subsidized the primary care practices to get it and then in terms of having the registry and all that other kind of stuff, that is part of the pay-per-performance things. Right? Do you have a registry? So, how can it happen to this country? I do not know. I get so pessimistic at this kind of meeting that anything subsidence is ever going to change.

MALE SPEAKER: What is it you needed actually from [inaudible] actually does pay practices a bonus who get recognized if you have this connection to the hospital which is was actually those kinds of things.

PAUL SHEKELLE: I do not see - for the smaller groups right now, at least again from reading the literature, because I do not go out and talk to all these groups. From reading a literature and people have done semi-systematic studies on

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this, the number one issue was always the cost. The upfront cost in doing this and they do not think that they are going to be able to get the return on the investment but the cost, because the people that are going to be saving most of the money are payers, and yet they want to do good but the hundred thousand dollar upfront cost for this thing and then the ongoing maintenance is just not something that these five person practices. They are going to be able to feel like if they can pay.

CHIP KAHN: Steve?

MALE SPEAKER: Sorry. The mic is still not on.

CHIP KAHN: Steve?

STEVE CORWIN: [Inaudible] the department community health plan [inaudible] obviously is permanent, but [inaudible].

CHIP KAHN: Steve, please push the button on your - it is right below you.

STEVE CORWIN: Thanks. The question started arising about 1982 or 1983 as to whether this system was paying and we finally were able to realize that if you looked at what would happen if we took the system away, you could analyze where we stood. It was very hard to look at it in any other way. What we discovered and I will bet is a general principle, is that there was a real trade-off that we have made which is that the

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system itself in the sense did not pay because we could have had a cheaper manual record.

But when we looked at the total functionality that we have, if we wanted to replicate that functionality, then it would have been significantly more, had we not had an electronic system to build on, then by having one. Okay?

So, if you follow that, then the real question is - for me anyway - is who starts saying, "What kinds of functionality really ought to be present?" In the sense, what are the standards of practice or performance that one needs to achieve? By setting those standards, one drives the use of more and more efficient systems to get to the standard. We do not have a standard-setting process.

I think we have been dancing around that subject one way or another because we are so used to a voluntary system in which nobody sets any rules and everybody decides, "I am going to put in my own system and it will do whatever I needed to do." that the whole thing falls apart when you look across the country and then start seeing these tremendous variations and performance, people still asking whether Acer does not pay et cetera.

PAUL SHEKELLE: The Boston group had sort of done these different and I forget whether they call them tiers or levels or whatever, start this data capture and decision support and

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CPOE and what have you, and at least they have concluded and I do not know how strong the empiric evidence base is for this but I think that there is some, is that if you do not start capturing the things you want to capture until you at least get those three things on board that I have just talked about, the electronic health record meaning where all these stuff is stored, the computerized physician order entry and then the decision support of at least of some kind and that is like the minimum core that you got to have to start seeing some of the gains.

CHIP KAHN: Theresa?

THERESA DOYLE: Yes, Theresa Doyle with Medtronic.

There is no question, I think, that electronic health record can improve compliance with quality metrics. I think we have seen that. But what I have been very interested in and actually, New York Presbyterians, your health monitoring, I think that is the technology where you are truly personalizing the care. You are looking at this patient based on the information that you have the data within a very robust information system and it is giving some information very specific to that particular patient.

Can you see - there is certainly maybe some places now and maybe it is things in the future where the process measures that have been developed are more sort of population-general,

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and this is very specific to the person. What happens when you run in conflict with maybe the process measures and what your system - this very personalized care is telling you what to do or the physician practitioner - how do you reconcile the two?

STEVE CORWIN: That is an excellent question and I think that we are all familiar with the process measured of - the infamous process measure which is that one should give an antibiotic in the emergency room within four hours if somebody coming in with a suspected pneumonia, and then in order to achieve that particular outcome, in general, what people in emergency departments did is if I suspect you are having a pneumonia, I am going to give you an antibiotic because I have got to meet the four-hour time window. Even though there is no evidence to suggest that that is the appropriate time window. That results in increased antibiotic usage, increased cost and increased incidents of resisting organisms in hospitals and so, long behold, the measure was changed. We cannot afford to have process measures that are not relevant to work flows and not relevant to ultimate outcomes.

Our view of the process measures is if it is a variance with an individual's care and what is sound medicine, we ignore the process measure. I think that may sound heretical here but some of these process measure, I think are counter-productive. What we are trying to achieve obviously is highly-personalized

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care within the context of a system that is highly reliable. Not, let us be at a 100-percent of every process measured if somebody decides it is now a new great process measure.

I will also add that I think that the road that we are taking on never events is highly-problematic and it is in my opinion very ill-conceived and if we are going the same road that we have gone down in some of these process measures.

PAUL SHEKELLE: Yes, [inaudible]. There is certain places that there are driving the progress out there like [inaudible], and even in some cases the VA. The [inaudible] out there, we all started them and had [inaudible]. With me, I'm happy right now if we could just get everybody [inaudible], okay so that if they at least know [inaudible] side effects are, okay, [inaudible] without the IT systems, I do not think that we are going to be able to [inaudible] and I do not see anyway, I will be happy to start worrying about the 10 to 15-percent that do not [inaudible] for whatever reason, once I can get it from 40 to 50-percent [inaudible] 80-percent and then I will come back after [inaudible].

CHIP KAHN: Larry?

LARRY: I just like to add two optimistic notes. I think with what Paul just said, the prospects for proactive practice in medicine are enormous now and you saw that in VA studies where by knowing who your patients are and having those

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very simple databases, you can then begin to proactively interfere. The other thing is that I think we are - this is based on 15 years with Intermountain on their IT board - watching this process develop and costs are enormous and implementation is a huge issue.

Part of it is getting nurses involved as much as doctors. What we learned was that if you get the nurses to get involved in inpatient process flow, the doctors usually follow because they rely on the nurses to do that. It is not always in terms of decision support, in terms of process flow.

But the optimistic notion here is in the past, it took an enormous effort to get doctors and some nurses to embrace these processes. But now, they are beginning to demand it because it generates that grew up with beta systems. They understand the software and the hardware, and what you now find - what we are now finding with the young docs is that they want these systems and they want to know why they cannot get them faster. I think that is an optimistic note.

STEVE CORWIN: I want to echo that. I think there is a huge generational divide and we are on the right side of that generational divide. The people that come into our institution from training programs demand it, want it, will not accept anything less than that and just cannot understand why certain things are on paper.

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Your point about nursing, I could not agree more and basically what I would argue is the EHR is one aspect of a very complicated care process. What we are trying to do is to automate very complicated care processes. If you do it well, the clinicians absorb it, want it and use it. If you do it badly and it does not fit with your work flows and how they care for patients, it becomes either irrelevant or something that becomes an added burden to the provider.

So, I think you have to look at IT as how do we automate our care processes and via that automation, how do we improve our reliability?

CHIP KAHN: We are going to do four questions very rapidly. Well, one, two, three, four. But before we get to those items - when most people talk about standards and the legislation talks about standards, I think they are talking about standardization. I do not think they are talking about standards of care. Paul mentioned one, which I guess the business community from leapfrog tried to do through product.

But, I have a question which is, should CPOE for some of those other things as you are going down your list, be a standard of care rather than something that people talk about you off? It seems to me that is the point that we got to make a decision whether this is actually an issue of standard care. But if you do not have it, you ought to be not a credible or be

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able to be sued, or is this stuff - how that works?

PAUL SHEKELLE: That is a policy issue. A little bit behind me.

CHIP KAHN: No. This year.

PAUL SHEKELLE: Sure. I think people [inaudible] order entry is something that we should all [inaudible]. I think that it has really [inaudible] by doctors initially because it takes more time. Every study or not every study, almost every study that has looked at [inaudible 0:52:05] motion of the implementation of the EHRs and CPOE has shown that it takes more time for the doctor to do their thing and they don't like that. Alright? I think that the alternative is worse. And so in terms of the current systems, I think that some of this is going to be adopted and they will have to take more time because then you reap the benefits.

CHIP KAHN: Okay. So, we are going to go quick here. One, two, three, four.

ROB MECHANIC: Rob Mechanic from Brandeis. Can you comment on the value of personal health records as people get more interested in those and how they would interact with either providers that do not have other electronic records or providers but do have other electronic records whether there would be either resistance, receptivity or actual active push to try and get patients to use them in their systems?

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STEVE CORWIN: We are participating in the Microsoft health law project. Our view is that electronic health records have to be patient-centric, not provider-centric. We encourage that and we think that the patient is entitled to their information. They should be able to cross systems, cross providers, and providers need to be able to access that information. They need to be able to act on that information.

So, we think some of the provider-centric or the software-centric philosophies are problematic. So, if you are an Epics System and you use Epic My Charge, I think you are on Eclipses System and use its record, I think that that is highly problematic in provider-centric, and we think it should be patient-centric, it should be widely adopted, getting people to adopt that - given all concerns about privacy, security, et cetera or non-trivial challenges, however.

MALE SPEAKER: Three quick points. One is in Massachusetts, we have the e-health. We are actually fully-wiring three communities. Some of the findings from that is that first of all, free - funding does not - it does not end there.

Free is not cheap enough especially in this smaller practices and that the implementation issues are different, more complicated than the larger integrated practices and all these really will not work to get us to the promised land that

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we have real health information exchange and two major obstacles of that are as funding for the exchange.

Funding for that which is a whole another issue of business issue and sustainability and this concerned that privacy, which is very real in a country you do not have universal health care, you have fears of medical underwriting, and other underwriting once your data is out there. So, we are not going to realize this until we solve the [inaudible] issues as well.

MALE SPEAKER: Yes. When you got problems on IT, usually, people open their speeches with regarding to the financial sector and how it matched that are not [inaudible] ready. My question to you or anyone here, is it that that is too simple of a model that what they do is implement in healthcare? I think we actually cost them at the financial services industry. Was not cost-saving, but they have to do it because the market demanded it. Or is it in healthcare that somehow the demand side just simply does not demand IT and smart application there up, and therefore obviously when in doubt we do not supply it. Where do you think the problem lies?

STEVE CORWIN: Well, I am very familiar with the financial services industry. We have an Eclipses crash that lasted about 36 hours. It was almost the cataclysm because we

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are completely dependent upon this thing. But that caused us to launch into a whole array of looks at infrastructure reliability and how these things are supported.

Now, a trading desk at Morgan Stanley is a 24/7 operation where they lose some astronomical amount of money if the thing is down for 10 seconds, let alone a day and a half. But the amount of money that goes into it from a capital expenditure standpoint is enormous. So, we could not achieve that level of reliability on our systems unless we doubled our current capital expenditure. We are spending about \$45 million a year on information technology on a base of about \$270 million of capital expenditure. We would have to double that which \$90 million a year.

One issue is clearly funding, and funding for robustness. I will submit to you though that that funding for robustness also buys you a hell of a lot in terms of what is the accessibility of the system, how good is your wireless infrastructure, how much the people just basically turn their computer on and get things going? That is part of the challenge here as the systems are not all that robust because you are not putting a ton of money into it.

CHIP KAHN: This is the last question then we will break for lunch.

Two points, it strikes me that the biggest savings, the

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biggest advantages of really good Health IT is when you can make comparison to cross multiple sites. That is what the VA does, that is what Kaiser being able to do, et cetera because each organization right now has sort of sub-optimized whatever they are doing and unless there are very clear guidelines, they need to look at other places that are possibly similar and see how they can learn from the others. I think the big savings that are going to be - that mean it is really a public good infrastructure issue rather than expecting each site to make it on its own.

The second piece is at the small level. The one, two, three dock level. Why do we just start with electronic claim submission and add on some small registries for people with hypertension, diabetes, and a few other things? This can be a web-based access data file. This is not a whole EHR but it gets Dr. Welby [misspelled?] used to turning on the computer and getting some used full information back on when his patients with diabetes have not had certain tests. We need to bring them on slowly. We are not talking about the New York presses on this.

JOHN IGLEHART: Thank you for letting me jump into this. I am just going to do a counterpoint at the House Point. Let me just use a very quick example, my wife practices an OBGYN, she does not know how to use a VCR but in her practice

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she uses a joystick guided laser because it helps her take care of her patients.

Unless, until we get to the point that HIT helps docs take care of patients, they will not use it. It becomes something else additional to do. And so it really does have to deal with the level of technology and the utility of this technology and it enable him to do their primary job, just taking care of the patient.

[END RECORDING]