

**AHRQ National Resource Center for Health Care Information Technology
Getting Started with Health IT Information
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Coordinator

I'd just like to welcome you to this afternoon's teleconference "Getting Started with Health IT Information." Our presenter is Dr. Atif Zafar. Dr. Zafar is a board certified internist and is the Information Technology Director for the AHRQ National PBRN Resource Center. Dr. Zafar has extensive experience conducting research concerning health IT including studies of speech recognition, mobile computing and best practices for electronic data capture in clinical settings.

This afternoon Dr. Zafar will present us with some information on implementing and getting started with health IT in the many ways that health IT can impact practice and some important issues when planning implementation as well as the ways that we might evaluate a project. With that, I'd like to introduce Dr. Zafar.

Dr. A. Zafar

Great, thank you very much. It's my pleasure to be here today. Welcome everybody. Again, today we'd like to talk to you about health implementation and essentially break down the talk as follows. We have a short introduction to what we define as being health IT and realizing that we have a diverse group of listeners today, we'd like to sort of set the stage to use health IT to manage and improve health care. We'd like

to talk about framework for change, how to embrace health IT and how to improve the care that they deliver. There are some common problems that occur and addressing them ahead of time can really help you troubleshoot throughout the process and get better outcomes in the end. So we'll talk a lot about that today. We'll spend a little time evaluating health information systems, help define what we mean by evaluation and what kind of evaluations are necessary and appropriate. We'll give you some case examples from some of the other folks that are working with real world IT information and then end with a question and answer session.

So in the first section here, introduction to health IT, let's go ahead and answer these questions. What's wrong with health care today that can be improved? How can health IT help you solve these problems? Health care is really fragmented if you look at the providers and care delivery sites. There are more than 360,000 care delivery groups in the U.S. today. There's often inefficient or absent communication between them. Sometimes there's also inappropriate communication, communication that's lacking in terms of quantity, quality of information and timing. There is also increased provider information that is going on and helps fuel this process. All of this fragmentation leads to miscommunication and medical errors that have been well publicized in the literature; especially when a patient is being discharged from a hospital and going

back to their primary care doctor, often that information is incorrect. There is poor documentation, illegible handwriting and prescription related errors. We have increased health care utilization because tests are being duplicated and unnecessary testing occurs; reduced timeliness of care; care that is being delivered later than it should have been and inappropriate or unnecessary care is happening as well.

Dr. A. Zafar

Okay, so coming back to what is wrong with health care, we have problems with data storage. If you look at the communications problem, that happens when you're talking about health care process, problems you find that a lot of data currently occurs on paper that resides in insusceptible silos behind the walls of institutions. All of these problems lead to miscommunication in terms of incomplete and inaccurate data. Oftentimes you're left to make clinical decisions based on this out of date information because that's the best that you have.

You also have problems of overuse and underuse. You have 30% of children receiving excess antibiotics. You have 50% of back pain x-rays that are not necessary. If you go to some of the links that I've provided here at the bottom for you, you can look at these types of problems in more detail as you approach and inform them about how which types of health IT are going to be appropriate for your setting.

There is an analysis done that showed that 84% of these errors were classified as being preventable. And in many cases what happened was that the patients received more than the recommended dose of a particular medication. The lawsuits resulting from these litigations resulted in almost \$4.3 million in settlements. This is a huge burden to health care today. There is also the challenge to continually educate. Harvard Business Review reported that physicians must keep track of more than 10,000 diseases and 1,100 lab tests; how do you make sense of all that in the very short amount of time that you have to care for patients? That is really what health IT can help you out with. We all know that it takes 17 years for best practices to be applied to health care. That is probably underestimated in some cases. There are some good references out there for you as you approach your stakeholders. There are some grounded reports, ARHQ has a lot of information on patient safety and how health IT can help you. If you go through, you can sort of figure out where IT would be most appropriate. There is also a cost and quality report that alludes to health IT.

What are the components of IT? How can these be leveraged to solve some of the problems previously mentioned? It is a very complex entity with many components. If you are sort of new to the health care field you may have heard a lot of words, clinical decision support, e-prescribing and administration records and so on and so on, all kinds of things on

standards and health information exchange and the master patient index. How do you make sense of that and how does it all fit together? If you break it down and use this framework I've provided here, it helps you think through the lens of health IT and help you figure out where to put your investment and figure out what's going to be most appropriate for your decision. You have an application layer to health IT where you have the actual software prices to consider, you have the communications level so that as your applications now start to talk to each other they speak the same language in order to be able to share the data. That is where the communication levels become important, because you have to not only send the data back and forth using what are called messaging standards, but you have to make sure you're speaking the same language and saying the same thing. You have to be able to code your data so that it is received on the other end and understood. Then you have sort of a process level layer where you talk about things like your policies and HIPAA security, privacy and how to exchange information. How does all of this stuff integrate into the work flow? Should it be a mobile technology model where physicians or providers are carrying tablet PCs into the patients' rooms? Should it be an ASP model? These are Internet providers that actually host the health IT applications, be it electronic medical record or something else. And you just basically use a web interface to access that. Would you like to use a PDA to do things like prescribing? These will fit into the mix in different ways. So the diagnosis here is an attempt to try to

combine all of these different words into one sort of architecture. On the diagram you see you have your hospital administration, you have a pharmacy system, a radiology information system and a lab system. And they must somehow talk to your databases on the back end, which include your clinical data inventory and some way of mapping those to the patient. You have a vocabulary that you define. You have a master patient index that lists all the patients through your system. And then you have these ways of communicating to the hospital's systems using the standards we mentioned. All of this happens through an interface system. We access that information using the rules engine or direct data upload. So in this way, you can kind of make sense of IT. The reason I bring this diagram up, once you understand the architecture, you can realize that in any of these an error could occur and things could go wrong that you sort of need to anticipate. So that is where the complexity comes in as you try to implement health IT. How do you set it up so you can anticipate the problems?

Specifically what can health IT do for you? And the next few bullet points I'm going to present are important. For those of you that are sort starting out and are starting to talk to stakeholders, these are the kind of bullet points you can take to them. You have IT solutions that provide you with data in the exam room, things like lab tests and test results. I often see patients and oftentimes they will ask me for a lab result and I might have to walk out of the room and look up that lab result on the computer system

and report back to them. That takes a lot of time. It would be nice if you could have a computer system in the exam room, be it a mobile system or otherwise where you can look up that data and save that time. You can also look up medication lists, lists of appointments and other types of process-related information that would be important when making decisions about patients. The other things you can have are tools for clinical decision support. As you are ordering medication it would be nice if IT could tell you that medication might interfere, or provide information about clinical knowledge, things you may not have thought about as you are taking care of patients. And then IT solutions can encourage prevention and patient education, help you work through preventive services, give patient handouts and other types of things. Health IT can help you with the documents, through speech and handwriting recognition, through radio things like interaction reception where you enter only the data that may have changed since your last visit. Things like automated clinical path ways through decision support and trend tracking. All of these things can be helpful as you are implementing health IT and talking about your patients. Health IT can coordinate our care delivery better. It can help you manage busy work flows, keep track of patients as they come to the clinic. We, for example, in our emergency room here in one of our hospitals use a function so that it lists which patient is checked in, how long they've been waiting, what their status was and how critical they were when they came in. That helps us because we can address problems as

they occur in sort of a real time fashion. These types of solutions can help you communicate with your front office staff. If I'm in the room and a patient requests a flu shot then I can be ordering that while I'm in the room and the nurse can be getting that while I'm in the room so when the patient comes out they can get the flu shot. Those are some of the work flow things. Improve patient satisfaction by improving instructions that are given to them, improve access to more care and deliver better patient care that puts in place better monitoring stamps. And then you can also bridge geographic disparities by helping patients from long distances like tele-information. In fact Medicare and Medicaid are starting to pay for some of these services. There are options using IT solutions that reduce the cost of care, help you select more cost effective interventions, lab tests, medications, bill more effectively, help protect you from lawsuits and provide better time management for your health care personnel. Now if you are in the business of health information exchange, for example, if you're sharing data across institutions, here are some of the common things and common data elements that you would need to share and solve common problems.

How will you account for that? Well you can share medication lists across distances or lab and test results and discharge summaries. The reverse thing can happen too, if a patient is being seen in the emergency room and they have a primary care doctor who is outside the hospital system, then

you could share things like clinic notes, medication, diagnoses and so forth. These are the types of questions you would have to address or these are the types of data elements you would have to share, including the referral question, which is one of the biggest things that is omitted when a patient is referred to a specialist, namely, what is the referral question? You would need to have access to their latest test results. The same thing on the reverse side, a primary care provider doesn't know what a specialist did or you need to access the clinic notes and some follow-up recommendations. Other questions regarding usage, there are many things which sharing data helps. If the patient was seen in other clinics or emergency rooms around the city or state and what was done there. In your area, our patients tend to move around a lot, so it's hard to keep track of what care is being delivered to them and at what point. Our shared repository helps us do that. We pull in data from all the other sites that have provided care for this patient. It helps us manage that end doctor better. You can keep track of which appointments are being kept or missed. Finally for surveillance in home health care, sharing data helps a lot. So all of these solutions are really compelling, but you have to realize that IT solutions will almost always be distracting and be abandoned unless specific attention is paid to the reengineering of work flows and reintegrating those into your work flows. That has been documented over and over again in many real world examples. For example, in one institution \$20 million was spent and after a few months it was shut off

because people complained so bitterly. You have to be careful how you approach them and make sure it's an evolutionary process and not revolutionary.

Oftentimes that is the best end product you're going to get, figure out what is really wrong with the processes in our system and then health IT sort of falls to the wayside. That is partly because of President Bush and partly why about 50% of the implementations end up failing. We know that sharing data saves lives, we know it's costly and it can have a future impact on return on investment and safety. Again, anticipating the problems that you will encounter helps a lot.

I'm going to switch gears and talk to you about a framework. Now that you've sort of appreciated how health IT can help you, how do you go about approaching your stakeholders and helping them see through the process a little bit and figure out how work flow can change. Nancy at Vanderbilt University created a nice document called Strategies for Creating Successful Health Information. This was written in 2003.

Although the content of that document applied to local health information infrastructures, things like RHIOs and what used to be called CHINs, but the organizational framework that was depicted there was really relevant in many different venues. I'm going to talk to you about that here. This approach is very sound, helpful and can be easy to follow and can help

you work through some issues. The hardest thing you have to remember is the cultural change that takes the most time. It's convincing the stakeholders that a change is needed and things will become better. In terms of this framework, you have an organizational layer where you would establish clinical, technical and leadership group. You have a technician there to establish the data standards and models and be able to test it out to make sure it's doing what it's supposed to do. You need a process layer where you define roles and responsibilities. Make sure you put a name to a specific role or task. And in order to make sure that that occurs, establishing clear communication channels between parties, this is often lacking in many implementations. That's a very critical part to make sure that things are on track. Establishing processes for coordination and processes for dealing with road blocks and how do you do a midcourse correction and so forth.

Educational processes are very important. In fact that's probably one of the best things you can do. In a good educational process to teach people how it will all happen. Financial layers, you need to obtain financial support early on and monitor how much resources are being used and have plans to address the sustainability problems. And then legal issues are paramount. Establish operating procedures and formal agreements early on. And also it helps a lot if you have political buy-in in the beginning. Talk to your law makers, Senators and establish this climate of trust for

these stakeholders. Make sure people don't get left out, that they're there, they feel they're contributing, they feel they have a place in all this. That will help you buy-in a whole lot. In terms of work flow design, there's an organization that provides what are called Davies awards. These are given to successful implementers of health IT on the national level. If you look at some of the winners in the past, look at some of the common themes that have emerged from their successes, we can kind of categorize them as follows. They didn't rush into things. They implemented things as those implementations working a very specific barrier to care. They identified those barriers and then they made sure that health IT was a process improvement tool and not an end to itself. All of these had to reengineer some kind of work flow that didn't automate a manual process in determining what didn't occur well -- that occurred commonly but wasn't efficient. Customer service was very important. They had frequent sustained end-user authorization and feedback with demonstrated perspectives. We would have days and invite people to come in and have Pasta for free. We provide what to fix in a very timely manner where people feel that their voices are being heard and that the system is improving. That helps a lot. Other people around the country have done similar things. In all of these cases, the system developers were also the salespeople. They all had plans in place for system evaluation and monitoring. So the same kinds of themes that Nancy talked about were pretty common in these winning implementations. A lot of information

and tools exist for work flow design, if you do a search on work flow design, you'll find a lot of words out there. Root cause analysis, health care failure mode, effects analysis, which is popular at the VA and DOD sites.

These are different techniques for using automated systems to analyze your work flows and then try to figure out what went wrong or what can potentially go wrong and try to fix those things. Many things exist for work flow redesign and depending on where you are and what you have access to, you could use one of those tools. But really, if you talk about anticipating problems, the first thing you should consider is good project management. That's really where your implementation should start is to have solid foundation for project management. You need a business system analysis step. Understand how your business will change from the business point of view, which steps will be eliminated, how your employees will change, how will the user interface for electronics change? How will the technical requirements be? Break down your project into sub project or phases. And then for each phase be able to understand the tasks within each phase and the completion time and the evaluation metrics to make sure that it's on track and successful and so forth. And then for each phase then have an implementation process and then an evaluation

process. A very regular methodology for project management will make sure that you keep on track and have successful outcomes.

I'm going to switch gears and talk to you -- really the meat of this talk is going to be talking about implementation of processes and some common sense things that you can anticipate when you have to go through these kinds of things. We'll talk about culture and work flow change, technology issues, performance and procurement issue action, cost and sustainability and so on. The middle four bullets that I have on security standards or designs and applications fit back to that diagram that I showed you. And these are the areas that can go wrong and we'll show you how to fix them.

Realize that HIT in most cases will initially impede your work flow, there will be a lot of resistance early on. You don't need to worry about that. You have to realize that as individuals embarking on using new systems you have a lot of learning to do. You have a new vocabulary to learn, how do I change the way I order tests or the way I make clinical decisions to having the computer help me in that process? That's a big learning curve for people. You have to anticipate how they could potentially go wrong and be prepared to support that effort. An example here that I give you, a nurse that worked for a group of doctors knew what kind of test each one wanted just by being with them for a number of years, she could correctly

enter it. When the doctors tried to do it in the system, they ended up ordering the wrong test. That was because of their understanding of an Echo is different from the computer's understanding of what an Echo is. They often selected the wrong test. Understanding how users think and how the computer is taught to think did make a big impact on the system. People have new work flows to work. Oftentimes in systems an order may not get acted on unless it's cosigned. Understanding if a provider has to cosign that order may be a process change for them and they may not catch on to that for a while. So orders may be left undone until the provider can do that. There's also the need to develop this trust in the back end processes. For example if I enter an order in the computer, how do I know what happens once I do that? Does it go into some kind of black hole? What happens beyond that? How does it get acted on? Who is responsible for taking care of that order and how do I see it's been acted on?

You have to expect that these kinds of things will impede your work flows and will take time to adopt. In many of the questions that arise is how do I enter an order for a specific test into the computer? What happens when I order on-line, where does it print? Who gets it? Does the pharmacy get it or hand it to a patient? Say the patient had blood drawn and sent to a lab, when will the result be generated? Do I get some kind of flag? Do I get paged? Those are the kinds of issues. If a script was printed how do I

know that a pharmacy filled it? How do I know that it was completed?
Where do I go if I have a question about entering orders in the system?
Oftentimes there's a chain of command for solving these kinds of
problems and providers will not be sure as to where to go to actually get
help. How does this particular screen work on this system? These
questions go on and on. You have to have the support in place when you
go live. So the bottom line is: don't underestimate the training required in
order to address the culture change. In many cases you will need full time
support staff and you may have to spend 20% of your budget on this phase
alone. We had a site visit to Cleveland and they were implementing a
system there. And one of the ways that they are approaching culture
change is by really understanding who the people are that work closest
with the providers. So it may be a nurse practitioner who is requesting a
physician. It may be someone else working with a physician and by
training them people got secure, it was easier to train the physicians than
have the physicians go to the help desk to get support. If you train the
people who work closest with your providers and have them be the
observers and the support personnel, then that helped a lot in this case to
get the buy-in from the docs. You have to have the catch-on features.
You need to advertise them well to everybody. As we talked about before,
insert the vocabulary that the user needs, as much as possible so there's a
seamless transition.

You want to make sure you troubleshoot your systems before you go live. That means understanding questions, have plans for disaster recovery and benchmarking and all of these other things. The message is to start small, work closely with the early adopters and let them blaze a trail for the others to follow.

In terms of security processes, there's still a lot of lack of trust in data security. Many providers still worry about what will happen if the system goes down. Do you need paper backups for everything? HIPAA compliance does not mean that the vendor will be compliant; you have to be compliant on your end as well. Vendors are responsible for making sure that their application is HIPAA compliant, which means they have log-ins and passwords and that the data is backed up and that the medium which it's backed up is secured but they don't have any control over your network. So if your computer is insecure in your office and you're accessing data on that, that's not up to the vendor to secure, that's up to you. You have to be sure you understand how to do that. Understand what HIPAA requires. So your institutional policies and procedures need to be HIPAA compliant, and in most of the cases they will be if you're a small practice that's smart starting out. You may need to invest in security personnel. HIPAA security broadly falls into these areas. You have physical safeguards and technical safeguards. This slide is kind of self-explanatory: documenting violations and audit trails and disaster recovery

plan, so on. This is common sense that has been documented before. This slide gives you in a nutshell what all of these different things mean. In terms of some caveats of security, a lot of people feel that they are completely 100% secure, and that's not the case. The way a firewall works is it prevents known ways of hacking into your system. But there are many ways of hacking that are discovered in everyday life. Those types of things are never protected by the firewall. So a person from inside may be hacking into your system and the firewall may be unable to protect you. What you need on the front end of that are people watching the firewall and making sure that's happening. They had estimated a number of years ago that this could cost upwards of \$120,000 a month. That's the very upper end of the scale. You could probably get by for a lot less than that. Understanding how things can go wrong will help you make intelligent decisions. Be aware that software opens up ports that you don't even know about. There are quite a few applications from very renowned vendors that will open up a port in your system. If you install that software on your system, suddenly you don't even know that you're insecure and your firewall and your virus software can't protect you. You have to be sure you understand what your software is doing for you. That all can potentially open up your system for hackers. Wireless networks are inherently insecure unless you have the expertise and know how to make them secure; it's probably not a good idea to use them. There are common sense ways how to make them secure. Having a security advisor

at some point is probably not a bad idea. So understanding your network security, architecture, do you have security personnel, are you using communication channels that are secure, things like SSL certificates and other 28-bit encryption or private networks. In our case, we use peer-to-peer. None of it's going through a network. It's going peer-to-peer. Understand if you have a firewall and virus protection and intrusion capabilities you still need people to oversee them. You need to educate your users. That takes a lot of time and effort and patience. It's your ASP that has to deal with the security issues for the most part. You still have to make sure that your computer is secure. But if you're accessing a secure web site to put in patient data then that's a better model for you than a traditional setting. So in terms of some common sense measures, for your passwords for example, log off when you leave a terminal. Use number letter combinations for your passwords, change your passwords often and don't reuse a password or give it to others. Be sure you understand your institution's policies regarding chain of command and disaster recovery. Security hardware is becoming more popular. Those are all technologies that improve and become less costly in a few years. Those are worth while to look into. And then be aware of what's happening nationally. The Office of the National Coordinator has a way to look at privacy. They're helping formulate better business practices. Stark laws are an important issue to consider. And new legislation hopefully will be coming down the pike and relax some of the Stark laws. Data communication, the

key thing to remember about standards is that they are not standard. There are many acceptable ways of representing data and some of these are very quirky. For example some labs will put the actual results in the message section versus in the actual lab section and in the unit section -- that sort of messes up your message. Your engine won't know how to interpret that message. Be aware of the system. You need to be to be able to oversee that. Realize that that's also a cost if you're going the direction of messages that you need at least one FTE or so to make sure that that message streams – and that it's secure and accurate. Oftentimes you need face-to-face communication to address problems like that. For certain types of data that you may want to communicate, there aren't any standards. Things like problem lists and analogies. All those are in development. It will probably be awhile before they are done and standardized. I'll go to the next slide. There are some standard harmonization efforts that are happening. The National Coordinator for health IT has a standard. There's a website that you can go and learn about what's going on. There's a new rule for foundation standards for E-prescribing that's important. In terms of design, if you're building a shared repository for health exchange, one of the things you have to anticipate is representing a clinical data in a manner that is not trivial. Codes like SNOMED and LOINC and NDC are coding standards and some of them overlap. You need to realize which ones you want to use and how effective it is and be aware of how many different ways people say the

same thing. Build your repository in way that will make sure your providers don't order wrong tests or oftentimes as you build repositories it's very important to be able to get data out of the system. You need to make sure that the purposes for which you want to get data out, be they critical care or benchmarking or administrative reporting, that you're able to get data out in a consistent and easy manner so you don't have to spend a lot of money and time in doing the kind of things that you intended for it to do. Having a dictionary helps for example. Many vendors will do this for you. You should be able to customize it and define what these additional terms ought to be. As you look towards evaluating, a quick and easy way to proceed is to be able to build instrumentation metrics right in. Have additional fields that define things like number of orders completed on line or averages for end point demographic information and work with your vendor at the outset so when you need to benchmark your system a couple years down the line, when you have to do a data pull, you won't have to review charts. These are the kinds of things you think about early on. Now the user interface is critical because it actually introduces the possibility of making errors. In one vendor system that we saw the patient selection screen and order selection screen are independent and not tied together. What happened in that system, you could go and order something and not select the patient first not realizing which patient's information system that order was going to. So it happened to be the last selected patient. So unless you made sure that you selected the patient

before you did the order, you could have the possibility of sending that order to the wrong patient's file. And that can cause all kinds of errors. In another system, the back agenda processes after your CPOE were not all electronic. That system is still the security into the user that the order into the system would actually get completed. Since there was no feedback ascertaining that order, the patient would come back later and nothing would have been done. Those are the kinds of problem you need to be able to anticipate and work through. Another problem we find with systems these days is the notion of alert fatigue. That means that a lot of systems and decision support systems are popping up these letter alerts and reminders. There's so many of them that they don't know which one to address and ignore.

It's a good idea to define what we call use cases at the beginning and have a requirements analysis chain. That ensures that you think through the full sequence of events. Make sure you have backup plans in case things don't function properly. Make sure you involve the users, the nurses, the physicians, all of those people who are going to end up using your system should have an interface in how to use that design.

You see what the problems are as you implement something. In terms of alert fatigue, there are some things you can do, you need to have a balance between too many alerts and missing critical alerts. Fine tuning this is a

fine thing. You often can't do that, that sort of comes with experience. As you delve into the implementation stage and start using your system that kind of comes naturally. There are some things you can do to help out the process. You need to have the flexibility in your system to turn off and on alerts. You want to make sure that the alerts are timely because that's the best indicator of use. Popping up irrelevant alerts will likely mean they're going to be ignored. A lot of times that may end up costing you more instead of improving the compliance with guidelines, these order sets basically bundled a whole bunch of labs together that you may or may not need. One that we can use may be to present the recommended tests or medications but have technician order them separately. That way, you sort of make sure the physician understands what the recommended tests are. Some other common sense approaches to alert fatigue, sometimes you want to display the indications and the price of the test that was ordered. It helps us really make sensible decisions about a test or a medication. It's a quick way to help change without overwhelming the user. You're basically telling them how much it costs and what the indications are for that test or medication. It's useful to list the suggested orders for follow-up labs. So you order a lab for a patient, you want to get a level within a couple of days or within a week. You want to get potassium. The same applies to when a new diagnosis is made or problem is documented. In some cases it has to force the technician to see the alerts. If a critical decision about an alert needs to be made, we

basically freeze all input into the system unless that decision is made. Oftentimes that takes very little effort, you know, one or two key presses is all it takes and you can move forward. On the back end of the process it makes a difference because that alert was addressed in a timely manner. System performance is a big factor in acceptance. A slow system will never be acceptable. You need to do some sort of pilot testing and mode testing to make sure that the performance issues are addressed. With some database backed ends unless you're dividing it right at the beginning, the database becomes very slow and quirky for technical reasons. Despite having faster connections -- it will become very slow. Some of these problems result from things like impatient use of caches or a need to look up a result and other sort of nuisances. To give you some perspective on that I've listed a link here that takes to the technical manual. You can see that the dividing ranges are drastically different. So you want to avoid a purely transaction database. It's best to optimize performance, so those results do get cached and looked up pretty fast. Pilot testing the database, we've ironed out some of these performance issues. Firewalls may be a problem and slow. Sometimes what happens is that network IP packets are broken down in front of the firewall and reconstituted on the other end. They break it down and reconstitute it. That can take time. But there's a way around that. So understanding how your firewall is working can make a big difference in performance. Now in terms of vendor selection, that's a big part of the implementation process. The advertisers' advice is

take your time. Are there many vendors and many places that advertise vendor selection processes? I've listed a few here for you. There's probably many others if you go on-line and do a search. Most of the time they're saying pretty much the same thing. The AAFP for one has a very good 12-step tool that you can use to select vendors, including an RFP process and checklists available for you including vendor rating forms. The website is listed there. If you do a search, you'll be able to find many of these. One of the things have you to remember about vendor selection is that oftentimes the vendors are going to report different metrics about their system, so it's hard too compare them. What you have to do is make sure you compare different vendors using the same metrics. This can become tricky. Make sure you ask them specifically about metrics you want to know about. Also make sure that you just don't listen to their demos but develop your own use cases and then ask the vendor how their product will work. That often helps you anticipate problems because you don't know how your system is going to get used.

Be aware of the standards. This is still a work in progress, but you can go online and read about the different things that are coming down the pike for you. And cost and sustainability is a big issue now. They're perhaps one of the biggest barriers. The one thing about data cost is convincing. Different studies report different returns on investment. In a study the ROI was not established until some time. In a different study they saved

almost a million dollars. It varies place to place. CITL, which is the Center for Information Technology Leadership, if you were to implement it in ambulatory settings that could save for the whole country. There are some publications that describe the proposal and that figure. And I've listed those links for you there. There are many case studies. For example, in Indiana some of the costs are being absorbed by sending data electronically, for example, our labs and other data delivery sites used to send data to their participating providers on paper and by using other means. And we've figured out a way to save them 20-cents on the dollar to do that electronically. Some of the sustainable models are coming from these projects and realize that there are many different ways of doing the same thing and in some places the cost is being absorbed if you can convince them that this is a good thing. The bottom line is that cost is an exceedingly complicated metric to resolve and will vary from place to place. But a better thing to do instead of sort of putting pressure on cost, do as your ROI, you have to put value on multiple domains. There are many other areas where health IT can improve your quality of care. There are long-term investments and provider and patient satisfaction and other intangible benefits that results from health IT that are very hard to measure otherwise. So be sure that you include them, as well, in your analysis and as you're ramping up to build health IT and planning the effort.

You want to be able to evaluate what you're doing and make sure you're having an impact on what you're doing. There's a really great website that I recommend. It's an evaluation search engine for papers and medical information that deal with evaluation. The last 20 years or so of papers that were published on evaluation in medical informatics can be found here at this website. You can do a search and basically -- you know, break down your search. It's worth looking at. Why would you want to evaluate something? Well, for many reasons, to get support from your stake holders, your providers and payers and the media to show the federal government. For some of you, they're your sponsors that are making a difference and that your voice counts in the policies. To share lessons with others you don't necessarily have to do a controlled trial to evaluate your implementation. What matters really is your story and how you're moving your field forward.

So the four key things you want to remember is you want to evaluate what's important to you and what you can afford to evaluate. Many times the budget for evaluation is small and you can't afford to do a randomized control trial. You do what you can afford. You want to tell your story. What makes you different from other sites? How have you done it better? How have you moved your field forward? Those are the kinds of things that people want to know about. We've come up with a nice table that helps us sort of prioritize which measures we think we should consider.

On the top here, you see a cost and resource dimension. And on the bottom -- on the left side, you see an importance dimension -- you have these categories where you say you have your cost and resource efficiency or your cost or resource inefficiency by just writing down the measures and how easy or hard they are to collect and how important they are to you, you can prioritize which ones you want to collect. This is a nice way of thinking through the evaluation metric process and figuring out which ones you want to do. You want to be able to instrument your implementations. That's a very easy thing to do early on by having the vendors put in those fields for you. You can hire research assistants to help you and interacting with them in their own settings and asking them questions as they're working through their work flows. Using that as qualitative information and stories in addition to focus group data can help you a lot in selling your ideas to others. Now, not everyone can do it in RCT or randomized control trial. What's popular are these before and after studies. You can use simple statistics to benchmark your indicators. There are other methods that you can use, such as generalized linear models. But these are perspective if you have the expertise to do these go ahead and do these. They are expensive.

We're going to talk to you about a couple of case studies before we go on to the Q and A session. These studies are from our Vanderbilt partners and from the Cleveland Clinic and have made an impact on care. So

where I work, we used to have in our clinic here, I'm a general internist, so we had some patient call-ins. And these were being pre-triaged by clinic nurses and operators. And the patient information was being noted on a piece of paper and handed to the doctor. The information that was noted included things like the patient wanted their medication refilled or their lab results or they didn't get an appointment that they were supposed to have or something like that, all those would be noted on a piece of paper and handed to the doctor. They get these stacks of paper to deal with, oftentimes what would happen you would have problems, multiple telephone numbers and processes by which the patient had to access the system and time consuming work for the doctor, who had to take that piece of paper and check the different systems that housed those results or the telephone numbers or the other types of information they needed and then get back to the patient. It took a long time and the process was inefficient. Sometimes the paper was lost. What we did, we did a to-do list on our computer system that allowed the nurse to capture that information and send it to the doctor in the form of an e-mail. The nurse would log on and capture that information, the next time the doctor logged on, they would see that e-mail. With the press of a button they could do things like order medications, lab tests, consults, checking phone numbers, it really helped facilitate this process in improving patient satisfaction. We found we were able to act on these about 53% faster than with previous work flows. Not only with that, but we could document it better

too. We had nurses who were automatically notified when that was completed, when a specific test was done so they could move forward -- it was a closed-loop system. Everyone who needed to be notified got notified in a timely manner. We also eliminated these duplicate call-ins. If the nurse tried to enter the same thing it would warn the nurse saying this patient called in before and that this list was still there so they didn't have to enter it again. So it made the whole work flow better. Now, at Vanderbilt, here's a process that actually was also addressed by EMR. They had nurses who initially put faxed echo results and other tests into a basket for the doctors to see as they came into the clinic. And then they implemented an EMR. And the reports suddenly just disappeared. So the doctors were overwhelmed. What happened to these papers? Where were they being sent? Unless they had that training on how to look up results, they just stopped looking them up. They needed an extra training step to get started. That's a case where the process wasn't fully addressed and there was some additional training needed in order to help with that. There are always processes that can go wrong. For example, poor reimbursement for elect cardiograms was a process in place. Electronic billing was inaccurate to help. You had a heart station that placed forms for pickup. These were returned for rework often once a week and then suddenly they implemented an electronic process and this duplicate order entry, this duplicate data entry problem then disappeared. And finally, we had some lessons learned on the recent site visit to the Cleveland clinic.

They implemented a very sophisticated order entry system for a group of affiliated hospitals. Now, one of the lessons is important for a resident physician. They will tell you right away if something is not working. So if you have access to resident physicians, use them. They are good resources and willing to help you out. When you are in the business of selling a CPOE to providers, make sure they have a contact person assigned to them if a problem happens. Then we talked about alert fatigue being a huge issue to address that work flow change must be incremental. Don't ask people to do a lot at once or errors will result. Implement the system one unit at a time and then move on. The notion that health IT will help you develop policy issues that will help you -- you will find ways to sort of fix them. The last is don't overwhelm the doctors too much with too much information. Be sure that as you train them, that you do it incrementally. That's where I'd like to stop. I'd like to thank you very much for your attention and I am happy to take questions.

Coordinator

Hi, thank you very much Atif. I will point out here as we start the Q and A session that you will see a little hand icon somewhere over here on the participant panel near where your name is located. If you click on that one time, you will raise your hand and I'll be able to see that and I'll call on you to ask a question verbally. You can of course also enter in your question textually using the Q and A or chat feature. And we can repeat your question to the speaker and the moderator for answer. I will also

open a poll at this time that provides some feedback to us on this presentation. I would ask that you fill that out before you log off today. With that, we'll go ahead and start the Q and A.

Dr. A. Zafar

The question:

Do you know of a recent study that measures what percent of primary care physicians are using an EHR?

I don't know of a recent study, but I know that the numbers that had been quoted before is in the order of between 5 and 10% of outpatient physicians that are currently using them. There are a very small percentage of outpatient docs that are currently using them. I'm not sure where those numbers come from, but they have been reported many times before.

Coordinator

We have a comment, whether there is an MGMA study in the most recent Health Affairs.

Dr. A. Zafar

Angela, let me just ask you, are the numbers similar or are they reporting an increase in the number of doctors using an EHR?

It says 15%.

I see there's a question on vendors for PCP practices. There are quite a few vendors. I don't know exactly the names for them. There are quite a few. One good place to go to would be for example the AAFP website, the American Association of Family Physicians. They have a very good EMR selection handbook. The other area that I might recommend would be the HIMSS website, H-I-M-S-S.org. They may have some references for you there as well. There's also an annual survey I believe that's put out by the Health Technology Journal that's a resource on electronic medical records and you know they kind of categorize them and compare them across the board. Health Management Technology, I believe is another source.

Coordinator

There's also a question that came in during your presentation that asked about user interfaces. The question was “can't the user interface help with some of the problems you identified with one dropdown list for terminology that may be missed or popup and two data entered into the other standard?”

Dr. A. Zafar

Yes, the problem is that you don't want to present that information to the user who doesn't have a lot of time to be able to delve into and refine and select from a very large choice list. You want to be able to anticipate that

ahead of time perhaps by the type of user or the location of service, things like that, and try to limit that list as much as possible. Because if you have five or six things from which the user might have to select, they might get overwhelmed and may not know which things they need unless you state in the choice list which ones are the best for which area. So I think you have to be careful when you design the EMR, that you understand the vocabulary ahead of time and then present that to the user. Aim for what the user expects rather than lists that they have to run through ahead of time.

Coordinator Thank you, Atif. We have a question from Shannon, so go ahead and ask.

Shannon One of the biggest issues that -- or biggest barriers that a lot of physician offices have to implementing HSR are the upfront costs. So I'm wondering if you might know of any possible funding sources or grants or things out there that we can help point physician offices towards and help them implement an EMR.

Dr. A. Zafar That's a good question. There are probably a diverse range of sources. Perhaps Joy can help with that.

Shannon Hi, essentially what I'm asking is if there are any funding sources, grant opportunities that physician offices in particular can try to get because one

of the biggest barriers for implementing an EHR in physician offices is this upfront cost.

Joy I'm sorry, I'm not familiar with what funding sources would be available for physicians practices on an individual basis.

Dr. A. Zafar There are, you know, certainly funding sources from the government, funding sources from private sectors that are probably worth looking into. I'm not sure if they're current or past. There are quite a -- probably -- I mean, I'm just guessing, there probably funding sources that exist. Oftentimes the funding sources require you to show value for what you're putting in, that you're putting in something to make a difference. It's part of a process improvement strategy. If you sort of spin it in that light and say, find the problem that you have that you want to fix, and then apply for funding using that model, you'll be much more successful in getting the funding than you were if you would say we're going to buy this. The government in terms of funding is one source. Private folks like private granting agencies, like the Robert Wood Johnson Foundation spin it in the light of the real process improvement strategy.

Joy

I am the project manager for the NRC. One of our issues in trying to get doctors on board with that is indeed the upfront cost. We go through the whole process with them. Again, one of the biggest issues is, yeah, that makes sense, however, we still need to come up with this money.

Some of our grantees are still having them pay for part of the cost of implementing an EHR from the ground up. It may be hard in some places to do that because of historic or other types of things. The other thing you may consider is going to an ASP model, which is a little cheaper to implement where really the physicians themselves don't have to be responsible for maintaining the data. It's almost like renting an electronic medical record where it's on a subscription-based service. You could use it using a web interface. They maintain it and make sure it's secure.

Dr. A. Zafar I think that's a good suggestion, because while it's certainly far from free, it substantially reduces entry costs and also is an ongoing maintain and support types of costs that would be incurred as well.

Joy Exactly.

Dr. A. Zafar Great, thank you for your question, Shannon.

Joy Thank you.

Dr. A. Zafar I see a couple other questions here. One gentleman asks about the use of home grown versus vendor purchased. Home grown is not a bad idea if you have the technical expertise to make that happen. It is quite an

undertaking. If you have that expertise and the funding to do that, it is a good idea because you can customize it better to your particular area and your implementation in your field and so forth. The vendor EHR or the one that you buy reduce the development cost, so in that case if you don't have that expertise the vendor purchased model may be the better approach.

I see another question on the continuity of care question. Not too familiar with that. I know it's a big debate now about how do you share data across institutional boundaries. And actually the health information exchange effort is designed to help solve that problem. One of the places where you may look is the Markle Foundation website. They're talking a lot about these kinds of issues. How do you share data? What are the standards, what's the information model to do that? I think it might be an extremity. I'm not sure.

Another gentleman asks about does your system allow the radiology image to come into the exam room to discuss with patients or just the report?

Actually in our system we do get images. We actually create a thumbnail version of that and we store it on a central server. We actually have the primary care doctors for specific types of images they are comfortable with, chest x-rays, bone x-rays and things like that that they are kind of

comfortable reading, we actually found that a compressed image has enough information to be useful. It may be a thumbnail but you can pick out pneumonia or a lung mass on those smaller version of those images almost as easily as you can with a full blown image. The report comes with the image so the actual large image has been read by the radiologist and the reading is there, but it takes much less time to pull up a smaller image on your system. You have access to that and can make a judgment. We are able to upload that image very fast right into the repository.

I see another question here about documenting work flow. What tools are used to document work flow so users can understand how it will interface with their work flow and is there an easy tool to use that in a practice could document their work flow?

Right, one of the easiest tools that we've used is really building a very easy, simple database on a PDA, and doing a time motion study with it. You have a research assistant and you go through and categorize all the different things. Maybe looking at a patient's chart, going into the patient's room, talking to the patient, talking to the nurse, talking on the telephone, looking up a lab result, consulting a -- you know consulting with a specialist on the phone, talking to a lab inventory. If you sort of go through and numerate all of those kind of things that a physician does, we use a tool called a handy base. We use it because we've got experience with it. We build a very simple system of those types

of work flow elements, and then we have a mechanism to time stamp things. You have an assistant following a doctor and they start the timer and they observe what they're doing. As they move from activity to activity, they switch through elements in that list, they are sort of able to time stamp. By looking at that type of data, we can benchmark what the work flow is, what kinds of activities are happening, how often are they happening, how much travelling is involved from place to place, are they mobile or sitting at a terminal. Once you have that data, then you can really start looking at ways to improve that work flow saying this doctor has to go to the patient exam room three times because the data is stored in different locations and they have to go physically to those separate locations to get access to the data. Well then a health IT tool that helps bring those data together in one place are more efficient. That's a natural way of implementing health IT in that environment. By doing something as easy as that, you can get a lot of data about your own work flow and figure out how health IT can help you make that better.

Speaker 3 I guess the follow-up question that I have is I know that that's how we do things at IU, where we have this gigantic medical center. How easy would that be for a private practitioner do or a small group practice?

Dr. A. Zafar I think instead of the research assistant, you could have a nurse or clerk doing the same thing. It doesn't take a lot of effort to be able to program one of these devices. In fact, you know, it's almost like learning how to use a word processor. Some of these tools are very easy to use. With a

little bit of motivation, one will learn how to use them and create simple databases like that and be able to sort of carry it out. Or you could just do it on paper. You don't have to do it using a PDA device. You could note down your activities on a piece of paper and list them in a column and just note down the times as to when different activities were switched from, you know, when there was a contact switch from one activity to the other.

Excellent, there's another question that asks about have you been able to implement any clinical trials?

Absolutely, one of the big benefits of using an EMR is that your data is actually electronic. What we have here is we've implemented a clinical trial service. We have a service that assists with many different features. We have research assistants that we basically station at every clinic so that any trial that comes along they are patient to follow along. They have to go into different clinical environments and try to recruit patients in those environments. Sometimes they are hostile and foreign to them. Why don't we provide research assistants, they're being seen as belonging to the clinic. In some cases they help with other clinic activities. So then these research assistants understand the work flow of the doctors, they understand how the system works and they can recruit patients. Now we use our EHR to extract very easily the inclusion criteria for a study. You might have a diabetes study that's going on and you want to find all the people for which you want to do some kind of intensive intervention. We're very quickly able to get that list of patients. That's again why you want to build an interface where it's

able to get data out not only in. We are able to get that data, create a list of patients who meet those inclusion criteria, generate a list of appointments for when that patient's going to be coming in, which doctor they belong to, which clinic they're going to see and then send that to the assistants so they can approach them and do interventions or do screening tests and things like that, all very efficiently. So, yes, we do use the EHR very much so in your clinical trial's work flow. And it helps a lot with doing clinical trials. I think that's where the country's going to go. A lot of people are talking about this notion of PBRN. In fact, in many of your areas where you are there may be a PBRN that exists already. So a PBRN is basically a group of affiliated or related practices in the same area or in different areas that have a vested interest in originating or studying questions related to the care delivered in those practices. For example in primary care, much of the research that's done in terms of clinical care in the country is done in care settings. So a lot of that information doesn't apply to the care that's delivered in primary care. So PBRNs are a natural vehicle for studying that kind of information. If I have 40% of patients in my practice report they have night sweats, what does that mean? Does it mean they all have to be screened for cancer or something? We don't know the answers. A lot of them are implementing EHR to be able so do those kinds of trials.

Coordinator I don't see any more questions on my screen. How about you, Atif?

Dr. A. Zafar I don't see anything else here.

Coordinator I don't see any other hands raised. We're about 20 till 5:00, so a little bit past 4:30. Unless there are any other hands we'll try to wrap things up.

I want to thank you on behalf of the national resource center for your time today. I'd like to thank you, Atif, for this wonderful presentation. It was terrific, and for your time in answering questions.

Dr. A. Zafar You're welcome.

And certainly you have my e-mail address there and please feel free to e-mail me if you have questions. We'd be happy to answer them as best we can. Thank you everyone for dialing in today, and we look forward to seeing you on another web conference sponsored by AHRQ soon.

Thank you.