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HEALTH CARE

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Panel 1 - Connectivity

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JOHN CLAREY
Chairman, National Medical Wireless Broadband Alliance

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Panel 2 - Investment and Usage

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P R O C E E D I N G S

DR. KAUSHAL: First of all, good afternoon. My name is Dr. Mohit Kaushal. Thank you very much for coming here today. It's a pleasure to welcome you all at the Health Care Workshop.

Before we get started, I want to give you some brief context of the afternoon. This workshop is one of about 30 that the FCC is hosting to support the development of a National Broadband Plan which due to Congress very soon at the end of February, so this is why Erik and I are looking at little bit tired. A key component of the plan is something that we're calling National Purposes which essentially is how broadband infrastructure and applications can help further the country's priorities. Our work falls into six main categories, health care, education, energy and the environment, economic opportunity, government operations and public safety.

Today's workshop is focused on health care, and I think no one would argue that health

care is a real major priority right now in the country. Our work is to define the ways in which broadband can support the delivery of high-quality and cost-effective care. The interface of connectivity, technology and health care is a very interesting one and the potential benefits are pretty enormous. Whether we're considering cloud computing VHR, interoperability or even home remote monitoring, the key backbone to all of these very exciting applications is good quality and widely disseminated connectivity. This is obviously a major focus for the FCC.

A quick word about my background. I only joined last week to lead the health care effort on the broadband team. By background I am a physician. After clinical training I went into the so-called dark side and I've been working in early stage health care start-ups as well as most recently in venture capital in Boston. I think it was really there that I got very passionate about this interface and convergence of digital media and health care.

This afternoon I'm very pleased to have two very interesting panels to help us go into some of the topics. Each panelist is going to have about 5 minutes to give a brief presentation, and then after each panel the FCC panel can ask some questions and we're also going to open it up to you guys and people on the Web.

Let's go into the topic. The first one is really going to delve into broadband and deployment and we wish to explore the situation with respect to, number one, What is the state of current connectivity of health care providers both in urban areas and rural areas? The second part of that is where there is connectivity, Is the quality good enough to support the applications we have here today but also looking at 5 to 10 years down the line? We're also going to briefly discuss the existing FCC Rural Pilot Program, and then finally the path forward in terms of further funding programs.

Our second panel is going to focus on investment and usage and we want to delve deeper

into how the federal government can be utilized to spur further investment into telemedicine. Secondly, we'd like to discuss the real barriers that we have right now in terms of adoption of telemedicine.

Without further ado, I'd like to introduce the FCC panelists and then the panelists to myself. To my left is Erik Garr who is the General Manager of the National Broadband Plan, and over there we have Ernesto Beckford who is the Attorney Adviser for the Telecommunications Access Division, and he has a real focus and expertise within the FCC's Rural Health Care Pilot Program. Finally, thank you all very much to all the FCC team to helped put this on. Ernesto and Tom Buckley who unfortunately is not here today have done a great job. Thank you.

First of all I'd like to introduce Doug Van Houweling. Thank you very much for coming here today. Maybe if you'd give us one second on Internet2 where you're the president and CEO and then do your presentation, please.

MR. HOUWELING: I'm delighted to be here to have a chance to talk to all of you about this very important issue this afternoon. It's been a key effort of Internet2 which is a not-for-profit organization that provides very high-performance networking capabilities to universities and research organizations across the United States and connects them with folks all over the world.

Internet2 has been a pioneer in developing really high bandwidth capabilities in advance of the marketplace, and as a result, we've been very much involved in our work with the FCC in the early conceptualization and then the deployment of the pilot program that the FCC is currently involved in.

This in fact is a map of the Internet2 backbone infrastructure and all of the places where we have been working with regional organizations to provide support for rural health care networking. In fact, something that we don't always remember is that the higher-education community works so closely with the major academic

medical centers, and the academic medical colleges across the United States, almost all of them, actually are involved as members of Internet2, and we also have a number of affiliate members who are members of Internet2, the NIH, the National Library of Medicine, the Veterans Administration, the Howard Hughes Medical Institute, so we already provide a lot of infrastructural capabilities to the leading edge of the health care environment. What we've learned as we've gone through that is the need for high bandwidth is being driven by the science and practice of health care because the amount of biological data worldwide continues to expand at an exponential rate.

If you actually think about this, what we're doing in medical science is we're increasingly able to go to deeper and deeper levels of the organism to understand how it actually responds to disease challenges, and as we do that, we wind up collecting data at all of those levels. So when we used to think about just information on organs, the amount of data that we

had to deal with was relatively modest, but as we're now working at the level of proteins and the constituents of proteins, we're going much further. Furthermore, as we move forward, each brain also represents an enormous amount of data and as we do brain scans we're moving into an environment where we're having a very hard time moving the data that we need.

When we think about image studies and making them available, you can see that T-1 networking just doesn't cut it. It takes an hour to move an image study using a T-1 network. The kind of network speeds that we typically use at Internet2 of a gigabit per second allow us to move these data sets in a few seconds. And let me tell you that if you're in an emergency medical situation and you need an image moved, you don't want to wait a long time.

Another application is in medical education. You see a picture of how people have traditionally learned about medical procedures. Here's today's version. Every one of these

medical persons is wearing a camera on their head and it turns out that the students who are seeing it remotely through the Internet-supported video are seeing more than the students that are in the gallery. Telepresence has become therefore a very important resource for medical education and medical practice. As you look at the amount of bandwidth that's required by the various vendors, you're once again up in the 5 to 10 megabit range for each participant. So if you've got 20 participants, you're all of a sudden up in the 100 megabit and above range for telepresence.

We're using telepresence not only for education but also for practice. Here is a picture of a physician's assistant remote from a hospital in Ohio working with the physician to evaluate the health of a young child. In Ohio there are now three different nodes that are connected to the Nationwide Children's Hospital, and once again we're working with multimegabit connections in order to enable the video conferencing. This is a great story. What has

happened is that with these remote clinics we are having in Ohio to transport fewer children from their home health care environment to the intensive-care facilities and reducing costs, increasing the quality of care they get because the physicians at the center at the Children's Hospital are better to evaluate children's needs remotely using this technology.

Internet2 has been focused on trying to see if we can't all work together to build a nationwide health network which at first connects more than six-thousand hospitals, almost four-thousand rural clinics, more than a thousand federally qualified health centers, and we think it's critical because it provides for support of research, medical education and clinical care.

But this goes beyond just connecting doctors in their medical care facilities to patients at other medical care facilities. We honestly think that if we pursue this effort carefully, we can start delivering these capabilities into the home. One of the uses that

we foresee is having in this instance a mother consulting with a doctor and a grandmother all located in different places by three-way DVD-quality video conferencing and health care monitoring tools where the grandmother is so that we could have still a family assisted capability to provide for health care for our elderly. I have to tell you that I would love to have that kind of capability in support of my own dad who I can't be with when they go to the doctor, but he would love to have me be there and I know the doctor would like to have me be there. I think that this is within our reach if we can deploy these technologies. Thank you very much.

DR. KAUSHAL: Thank you very much. Our next panelist is Scot Eberle who is the COO of FiberUtilities Group.

MR. EBERLE: Thank you. It's a pleasure to be here and I'm glad to participate in the panel.

Let me tell you a little bit about FiberUtilities Group. We are a group that's based

in the Midwest. We are a private company that focuses on technology management for private enterprises. That might sound a little odd, and what is that? In the simplest sense, I've got a firm that's full of a bunch of industry folks, myself with 25 years on the carrier side of the business. I've got partners that have been in the cable business, the wireless business, the LD business, the CLEC business, so there's a lot of industry experience within our firm. The focus of our firm has been to identify opportunities for our clients to what we describe as next-generation networks, and I'll describe that in just a second here. Today we manage about 8,000 miles of network across primarily the Midwest and we've been focused within the pilot program and have got what I would call successful programs moving forward through the process with USAC and the FCC.

Some of the drivers behind why these networks are important, and Doug has hit on it and I'm sure every panelist is going to talk about, but what we've seen from a client standpoint, the

driver is behind broadband. From the technology side, the PACs and the imaging requirements, and it doesn't really matter on the geography, you can be in a metro market or you can be in a rural market, the ability to move information at the price and at the right speed is critical, and we've seen a bit change on that on the gear side, a lot more capacity is there, so the limiting factor continues to be as Doug said on the network side of it.

Storage requirements for the hospitals and for the physicians to have the records and information at the right place and being able to get at it at the right time is a critical side it, and all the records and HIT initiatives that are happening, that convergence of all of those needs really drive into the broadband side, and I'm going to cite a couple examples of clients, limited capacity within existing infrastructure, the ability to not move that infrastructure much larger in order to get the right kind of connectivity, cost pressures within the

enterprises, their ability to go buy the right kind of broadband connection, but there's a pressure from a financial standpoint as to where does that make sense for them to move it forward, and just as importantly, the increased need of information at the right place at the right time with the right level of security around it.

An example. One of our clients, the Iowa Health System, through a process that we worked with through them over the last 4 years made a private investment after analyzing their existing network which is a combination of carrier networks throughout the State of Iowa made a decision to privatize their network. So we implemented a program, it is a complete 2,200 mile network of dark fiber that's lit and controlled. We manage that on their behalf. That's one of the things that FiberUtilities Group does. But they saw such a business need moving forward to better serve their patients that they made the investment in the network 4 years ago and the payoff for them has been enormous. They're a large system, the

largest in the State of Iowa. They have 11 large affiliate hospitals with over 140 different clinics. So the combination of connectivity really allowed them to change the way they deliver medicine today, and it's a fairly compelling story from how they do it in the rural areas to the metro areas, so it's a pretty significant success story based in the Midwest.

Through their leadership and as we put the network in place, they acquired an additional fiber throughout their network, and so one of the programs they've made an investment in through the pilot program is they've invested into a second pair on that fiber network, and so they've lit that network. The first pair that I just described for their core usage, all their hospitals, all their data, everything that they're using internally. The second network is for the utilization of all health care systems across the State of Iowa, the doctors, the other hospitals, to exchange information at a multigigabit level as Doug said earlier, so to have something that

enables a new way of delivering health care, and the vehicle that we've used has been the pilot program, and successful used it. We've worked very aggressively with the FCC and with the USAC folks to develop a plan that allowed us to do that. We made a decision to utilize the carrier environment in the State of Iowa and what worked out from a partnering perspective was that we were able to take those FCC dollars and invest it with that carrier to build a long-term 100 megabit connection that allows for the future-proofing is what I would say of the medical network in the State of Iowa.

The second one is a little different network. This is in the panhandle of Nebraska, and if anybody has been out to the panhandle, it's a beautiful part of the country with great people out there. The challenge in the panhandle is there really is no network. There's a lot of older network out there, but really no high-capacity network out in the place today. The panhandle has 6.5 people per square mile. They

were awarded again in the pilot program about a $20 million program. The challenge out there is to interconnect the nine hospitals together. You talked about some of the stories. Some of the stories of how they deliver health care today is in some of the smaller hospitals they bring people up under the Polycom, they shoot the picture to show that patient, and then they shoot the information to the major hospital which is in Scotts Bluff and they diagnose what to do with it. There are stories about they're transporting that patient back to Scotts Bluff which is over an hour's drive, the patient gets there before the information does over the T-1, so it's really a challenge for them to develop the way they would like to and maintain the physicians they have and provide the quality of care they have. The exciting part about this program is we've advanced it. We're in -- stages from an RFP, and we will be deploying a Greenfield fiber network out in the panhandle of Nebraska which will completely change the way they can deliver medicine out in the

panhandle. The second thing it will do is it will allow that infrastructure to be leveraged by other people who can develop other technology solutions in the panhandle. Part of these projects are, number one, the grant and having the money, but the most important part after that is the ability to make it sustainable? How do these things survive? So the challenge has been in Nebraska, and I think we've solved it, is utilizing a second pair of fiber to become sustainable in the network and have had great results and great success with that so far.

By wrap-up, I'm a big believer in infrastructure and I'm a big believer in big broadband. I think it enables a new way of doing business and it enables a lot of things, it really does, but also can be a tremendously limiting factor. If it's not there, it won't happen, and I think you can see lots of examples of that when things were there, new things started to develop. So big broadband to me and next-generation connections, we should on the future side. Don't

make the investment in today's kind of technology, make it in tomorrow's. Our view is if we look at first mile should be 100 meg or better. Some people might say that's an enormous amount in a rural area, but if you think about that going, if you look at the gear, and I'm sure there are people who will talk about some the electronics in the gear, just the connections off of this gear are moving away from a gig, they're going to 10 gigs, 40 gigs, 100 gigs. So we need to have the roads or the infrastructure get ahead of that power curve, and I've experienced that with clients that when you put the infrastructure in it's amazing what will happen to their business model and I think the same thing will happen to health care, so big broadband. Have networks that can be multipurpose so that the investment that's made, allow that to be utilized in a lot of different ways. Don't make it proprietary. Make it open. It will enable new things to happen across the marketplace, and again, we've seen proof of that in several of the networks we've

done.

The third part of that is I think that carriers should be part of this. When working with them and finding a place where they can win, where the client and the enterprise can win and the community can win, I really think again having this kind of infrastructure and these kinds of big roads will enable a lot of stuff that Doug talked about, having the right kinds of pipes in place, and I do that government plays an important role in that in helping fund that kind of infrastructure. Thank you.

DR. KAUSHAL: Thank you. Next we have Alverson who is Professor of Pediatrics at the University of New Mexico School of Medicine.

MR. ALVERSON: Thank you, and good day to everyone. I want to thank the FCC and everyone here who has given us the opportunity to make comments about broadband and health care which is critical to this nation and I would say the world.

I'm the Medical Director of the Center for Telehealth and Cybermedicine at the University

of New Mexico. I'm also the President-Elect of the American Telemedicine Association which broadly represents the telemedicine community in this country and around the world. I'm also one of the participants in the Rural Health Care Pilot Program sponsored by FCC.

We were asked to address various issues, and my focus is going to be on the Rural Health Care Pilot Program. What are the lessons learned from the FCC's pilot to date? What are the successes? What could be done to improve the program? And whether we should be incorporating the traditional urban rate discount program for telemedicine as well.

Coming from a large rural state, New Mexico is the fifth-largest state, we're thirty-seventh in population, we're quite rural, and access to health care services, health information, education and training, is a real challenge for us. When we looked at the FCC's Rural Health Care Pilot Program we saw an opportunity, a goal there put forth there to

facilitate the creation of a nationwide broadband network dedicated to health care, provide funding for up to 85 percent of the applicant's direct cost. This program was established by the FCC to help public and not-for-profit health care providers deploy a state or regional dedicated broadband health care network, so really something we're here to talk about today.

As an example, in our region in the Southwest, this is a huge, complex, challenging project that really is based on a network or networks, what we call a Southwest Telehealth Access Grid. We have several stakeholders, actually about 17 different stakeholder groups, representing a variety of health care provider institutions. And then looking at how we best integrate the high-speed backbones across the country, Internet2 or National Lambda Rail.

Where are we at? The current status as of August 12, 2009, last month, we're in the final year of a 3-year program, approximately at the time of this report we have 10-1/2 months left to

encumber the funds allocated. There have been mergers in currently 62 out of the 69 original projects going forward, but as of August 12, 2009, we have 47 requests for proposals for 33 projects, that's 53 percent of the projects, at that point in time have actually have been committed. Twenty-six funding commitment letters for $20 million, that's less than 5 percent of the $417 million in funds allotted, and we're in our final year and getting into the eleventh hour. Six-million dollars has been disbursed and that's less than 2 percent of the funds allocated?

What does that tell us? I could go into a lot of detail. I've done this before. We've done a SWOT analysis. The strength of course is this is a great idea. This country needs broadband for many, many applications, but certainly for health care as well. What's the weakness we're seeing? The process does not seem to be working well based on what I just said. What are the opportunities? We have plenty of opportunities to improve the process and to

achieve the goals of this program. What are the threats then? The threat is we'll have unsuccessful project implementation and, thus, have not realized the true benefits of this program.

What I'd like to do in wrapping up my presentation is to talk specifically about recommendations that we would like the FCC to consider. First of all, recommendations for the program in general. There are numerous problems that have surfaced in the implementation of the program in part due to the traditional Universal Services Administrative Company, USAC, process. It's not their fault, but a process that doesn't seem to work well for a program to complicated that is a pilot. What's our general recommendation? Let's open and facilitate and expedite the process and reinvigorate the pilot nature of this project.

Specific recommendations are to treat this a pilot program with more self-management, and we are recommending on behalf of many of the

stakeholders involved in the project to extend it an additional year. The recommendations you can see in detail and I believe these presentations will be made available to those on the FCC Webpage. I'm not going to go into detail, but we feel that we should allow the selected participants who are self- provisioned for components of the projects such as network design studies and modeling to access their budget funds directly without requiring competitive bidding. And due to the delays, extend the pilot project funding period to 2011, particularly since the program didn't officially start until January 2008, well into the first year.

We'd recommend creating an advisory board. There are inconsistencies across current projects and interpretation of the original FCC order and its intent and a need for effective and efficient input to FCC from a variety of stakeholders, many on these panels today, and other subject-matter experts.

Provide funds for project management and

administrative support. Despite the complexity of many of these projects, no money was allowed to be allocated for project management. Those RFPs and those service providers who bid bundle in the administrative costs, yet those of us who have fiscal and legal responsibility for these projects receive absolutely no funding to manage these complex projects. We'd recommend the use of some federal dollars to support project administration and project management costs, and they need to be allowed.

We would ask that the requirement for progress reports until the project is implemented be eliminated. We have to submit quarterly project reports in great detail without little progress being made, so we feel that that requirement should be lifted until funding is actually dispensed and the project has started.

The next recommendation is to remove the requirement for a sustainability plan prior to access to funding. This was never required in the order when the proposals were submitted, but after

proposals were selected, we were then bold before any funding commitment letters would be issued, we must have an acceptable sustainability plan. We definitely agree that sustainability is an important aspect, but this is a pilot program. Not every program will be successfully implemented. We learn from pilots and we believe that since it's a pilot program, requiring a sustainability plan should not hold up funding, and in fact, this created a shockwave through most of the selected participants and may be a cause for some of the delay.

We'd also recommending changing the 15 percent cash match requirement. The current severe economic decline and considerable delay in providing a final funding letter have left many project applicants desperate to gain immediate access to their 15 percent cash which is required. We'd recommend that the Commission set aside the match requirement or at a minimum adopt a more liberal position in accepting in-kind contributions including administrative services.

Allow aggregation of services in avoiding silos. We've heard already from the panel that what we're looking at in this country is to take broadband and aggregate several applications, that this idea of having a siloed dedicated telemedicine network we don't believe really goes to sustainability, that we should look at opportunities to bring in a spectrum of applications. This can lead to higher volume, meet more community leads, and can lead to better price points and sustainability. So we'd like to see all of the Universal Services' programs, namely schools, libraries and health care and others collaborate in leveraging existing resources. Currently the FCC is funding several different and disconnected networks in rural areas and this could be streamlined to build a communitywide public-sector network.

The final recommendation is to align the FCC's programs with other federal programs in the health care delivery system. The current program approach is dated and several critical gaps, with

inconsistent with many components of health care delivery and use of telemedicine. So we would like to see a broader and modernized definition of eligible health care providers to include new provider types in the whole continuum of care, and as we heard earlier, actually looking at how do we use broadband to get health care to the consumer, to you and I as patients? That means getting it to the home environment and supporting remote monitoring, that it's not just hospitals and clinics, but it's all of us.

In summary, the recommendations are to treat the program as a pilot with more self-management and extend it an additional year; create an advisory board so the FCC can get ongoing dynamic input from the health care, network and technology communities; provide funds for project management and administrative support; eliminate the requirement for the progress reports until project implementation; remove the requirement for a sustainability plan prior to access to funding; change the 15 percent cash

match requirement; allow aggregation of services and avoid silos; and lastly, align the FCC programs with other federal programs and health care delivery systems. Thank you very much.

DR. KAUSHAL: Many thanks. Next we have John Clarey who is the Chairman of the National Medical Wireless Broadband Alliance.

MR. CLAREY: Thanks very much. I'd like to thank the FCC for giving us this opportunity to talk about the plan that we have to deliver wireless broadband to the point of care.

The National Medical Wireless Broadband Alliance was formed earlier this year to provide high-speed wireless broadband access to nurses, doctors, public safety workers, IT specialists and the communities they serve. The group is now 100 hospitals and growing. The hospitals range from small health cares, critical access hospitals, to hospitals with over 800-bed large-scale facilities. It's focused on developing open-access wireless solutions to deliver wireless to the point of care. I am a 20-year veteran of

building out wireless networks and broadband networks and the alliance's President, Steve Solomon who is here today is a 25-year veteran of the health care industry.

The primary issue we have in health care or one thing that is a big challenge is where we are in electronic medical records and the deployment of electronic medical records at all of our hospitals in the health care system. We're way below the industrialized averages, below 30 percent, and one of the reasons why is we have a choke point at the point of delivery of these systems. Closed wireless systems and systems inside hospitals that cannot delivery open access to all the caregivers make it very difficult for these systems to work. The impact is it stifles adoption of new technologies. Each of these panelists have talked about fiber and bringing fiber to the hospital. The problem with bringing fiber to the hospital is that it doesn't stop there. You need a network infrastructure inside the hospital to deliver the actual broadband to

the point of care.

The solution that we provide and that the hospital group is pursuing is a distributed antenna system that goes inside the facility that delivers the entire spectrum of wireless technologies throughout the facility. The challenge that these hospital administrators have is they have everything from a 450 to 6 gigahertz wireless spectrum that they're having to deal with and within each of these different frequencies that have public safety, they have a variety of different wireless carriers, they might have Verizon, Sprint, AT&T, T-Mobile, they may have a dedicated wireless telemetry system, they probably have some kind of a WiLAN/internal LAN, and they have all these different systems running different discrete networks. What that causes is a problem of open-system operability because each network is its own network that operates without allowing other people onto the network, so if you have one wireless carrier in on a network on a contract and another wireless carrier is not on the contract,

that particular phone or whatever that wireless device is will not work. The same thing happens with the various wireless telemetry machines. So what we're doing and what these hospitals would like to see is systems that are built that provide all of these solutions on one system so that they can bring broadband to the point of care across the board.

In conclusion, we're grateful to take the opportunity to speak about this national plan and we've love to take questions later in the conference.

DR. KAUSHAL: Many thanks. Our final panelist is Raju Prasannappa who is the Chief Technologist at the Harris Healthcare Solutions Group.

MR. PRASANNAPPA: On behalf of the Harris Corporation, thank you very much for giving us an opportunity to present our ideas here.

My name is Raju Prasannappa and I'm the Chief Technologist for Harris Healthcare Solutions. First, a few words about Harris. We

are an international communications and information technology company serving government and commercial markets in more than 150 countries for over a century. The company is headquartered in Melbourne, Florida, and is dedicated to developing and delivering best-in-class solutions in communications products and systems through four major operating divisions.

As our national goes through this unprecedented health care transformation, we are on a mission to revolutionize the quality of health care. We are bringing the full breadth of capabilities of the corporation and our capabilities in nonhealth-care domains to solve some of the toughest challenges facing health care today throughout the U.S. and the world. We are committed to improving the health outcomes through the concept of enterprise intelligence by assuring critical medical information is delivered with security and privacy to the right person on the right device and at the right point of care, and we believe that that's going to be the key

improving health care and reducing costs. Availability and affordability of broadband capabilities is very critical to the success of almost every single innovation that's being worked on in health care today. Without that, it's almost impossible to get the best return on the investment. Also, and this was mentioned earlier, broadband affects player participating in the health care value chain. What I call the health care value chain, every one of us here is a participant in that. I'm also distinguishing between the players in the health care value chain, the providers, consumers, researchers, payers, hospitals, labs, pharmacy companies and pharmacies. We all have a role to play in this.

In addition, there are many key elements of health care reform that are being discussed that cannot be implemented without the existence of a robust infrastructure, as an example, the health care exchange. If the can't review the exchange and look at the exchange, they will not be able to get the best care. I'm going to

illustrate this with a few examples. What I'm going to emphasize is more on the interoperability issue and the benefits that it can bring. I think we have seen interoperability at a different level, at the electronic health care level. There has been a lot of progress on the (inaudible) and also a couple of other initiatives, but I think I just can't overemphasize the importance of that.

In today's transient and mobile society, global access to stored medical images and documents is crucial to better patient care, and I picked images for a good reason, because of the size of the images and the amount of bandwidth you need to transfer images. It's particularly important to patients who have had testing and treatment at multiple locations with a city or region or even globally. Technology is available to deliver clinicians the complete set of images needed to make informed treatment decisions at the point of care no matter where the personal data resides, but the key is to get those images to them. This technology complemented with Health

and Human Services' National Health Care Information Connect Network can enable virtualization of care with patients and data all integrated at the point of care; without the full set of data, decisions cannot be made. We can enable medical images and documents to be linked to a patient's electronic medical record, quickly locate it, and share it online for viewing and collaboration at multiple sites. Availability of a reliable broadband interoperability is key to successfully implementing this type of capability. This cannot only impact how health care is delivered today in the world and universe, but also significantly affect the cost and quality of health care.

My next example is from the emerging field of digital pathology, an area of research and development at Harris. Today digital pathology is where radiology was 10 years ago. Now you can have radiology images delivered around the world and you can have 24/7 reading of the images through networks, and a lot of other

companies are doing it, but pathology is still in its old state. It requires an ability to manipulate large-scale images, almost gigabytes of images with multiple images associated with a single sample. The single sample could almost be 10 to 12 images with infinite (inaudible)

We can provide the pathologist the same seamless viewing experience as they would have with the microscope. If you talk to pathologists, they're so used to reading with a microscope and if we can provide the same level of experience we can almost virtualize pathology and meet the increasing demand for pathology services and also work on the challenge posed by a shortage of highly qualified pathologists. Again, broadband can play a crucial role in making this a reality.

Another area of extreme importance and desperately in need of interoperable communications is the field of emergency medical communications. I would refer you to the findings of the Joint Advisory Committee on Communications Capabilities of Emergency Medical and Public

Health Care Facilities which came out in February of last year to which I also contributed. I'm going to read the last two lines of this, "Robust broadband networks can route emergency-related communications traffic rapidly, securely and reliability and ensure that patient information is available in remote locations." I'm going to illustrate that with a simple example. The Department of Interoperable Standards -- broadband networks built on common and standardized IP Internet protocols can facilitate the transmission of real-time video, pictures and graphics in a mobile environment to create virtual emergency rooms at the scene of accidents, disasters, as well as en route to hospitals. This means that the care of the patient does not have to wait for a rescue unit to reach a treatment facility, but can be provided immediately upon arrival at the site of the incident and during transit. We can even use mobile emergency vehicles to provide ad hoc networks and provide bandwidth for emergencies. This can provide capacity for

critical patient information to be available prior to the patient's arrival at the emergency department and thus optimize response teams and facilities. You can imagine what an effect this can have in responding to emergency situations and especially disaster situations.

As you can see from these examples, there are a variety of players in the health care value chain and each of them has their own unique needs. One of the biggest challenges is to determine the infrastructure needs required by each player. Everybody requires different levels of care infrastructure and there are many factors that influence this, the most important being the type of services they provide. For example, the needs of a primary care physician are different from that of a radiologist or a pathologist. Primary care physicians generally do not need to view diagnostic quality images, but will need access to referential quality images and also to lab results and electronic medical records. Whereas a radiologist will have to access

diagnostic quality images so that they can make the analysis and look at the images and also to be able to look at it from anywhere they're residing, even on a desktop or a mobile device.

An emergency room should also be able to receive vital sign information, radio feeds from a remote location, and be able to video conference with a remote location. Again, another example would be a distance management services provider receiving vital sign information from multiple devices, from multiple geographic locations and be able to transmit required instructions in multiple formats, text, audio and video.

To my knowledge so far, I haven't come across a comprehensive study to determine the different tiers of infrastructure needs of consumers and providers of health care taking into consideration both the current needs and the emerging needs, and this study would be beneficial to both the health care and the communications industries. I'd recommend that as the National Broadband Plan that the Commission examine

different tiers of broadband infrastructure required by various health care providers, and to the extent necessary, recommend in the plan that such information be continued to be collected in order to ensure the infrastructure and bandwidth needs of everyone in the health care ecosystem continues to be met.

I will end my presentation with an example that's close to my heart and it's been in the news lately, as of yesterday in fact. Pancreatic cancer is one of the deadliest forms of cancer. Once the patient is diagnosed, there is very little time to waste. The clock is ticking. The patient and the family should in the comfort of their home be able to research the options available, educate themselves, get advice and find the best place for care, and share personal health records with the specialist and also the images, with the highest level of security and privacy, be able to get the necessary care at the place of their choice, and also to be able to monitored remotely after a treatment plan has been

determined and implemented. Much of this would not be possible without reliable and affordable infrastructure and connectivity. The FCC's recognition of the role of broadband in health care and their commitment in this important area is evident from the current programs such as the Rural Health Care Pilot Program and this very workshop. I thank you for your attention and support. On behalf of the Harris team, we are excited about being a part of the next generation of health care. Thank you.

DR. KAUSHAL: Thank you. I'd like to thank the panelists for their insights. We're going to have about 30 minutes of questions now from the moderators and then we'll open it up to the audience.

First, the current state of play. We would love to hear your thoughts and perspectives first on what is the connectivity state now for places where health care is provided and are there any learnings to have in terms of types of places which aren't connected? I would love your

insights on that topic first.

MR. ALVERSON: This is Dale Alverson from New Mexico. Clearly in much of this country we have incredible gaps in broadband. There are huge digital divides, and so one of the efforts obviously is to create an affordable broadband infrastructure that serves every American regardless of, and broadband becomes important not only for rural America but for metropolitan areas as well, not only to be able to provide services to rural areas, but for citizens within these urban and suburban areas. So it's going to be really important in the Broadband Plan to look at how do we then get affordable connectivity to every American that needs it and desires it. I would also recommend that when we look at it, we look at it broadly. It's not just health care as I mentioned earlier, it's education, distance learning, connecting libraries, the schools and colleges and universities, but also business and government. So by aggregating those services I believe we can come up with a much better price

point that provides a return on investment for industry as well as provides a whole spectrum of services needed by people throughout this country.

DR. KAUSHAL: From your experience, do you think the major issue is a lack of connectivity, or the second topic I was going to discuss, just the lack of quality of connectivity?

MR. ALVERSON: I think it's both of those, and I believe it's also affordability. I'll give you an example. In Ruidoso in New Mexico which is not quite 200 miles away from Albuquerque, for a connection to provide for health information exchange in telemedicine with the hospital, it's currently $12,000 a month for broadband. The price will go up to $17,000 a month this coming year. There is absolutely no way that I believe that we as American citizens can afford that or tolerate it. We have to look at not only broadband and continuing to support broadband because they think it's so critical for that community, but we've got to find ways of enhancing broadband and making it affordable for

everyone. And if we're going to actually reach out to the individual consumer when we're looking at price points that high, it's just not going to work. So we have to look at those things, filling the gaps in adequate broadband that can support all of these applications and make it affordable.

DR. KAUSHAL: Thanks. Maybe Douglas or Scot, given your experiences, I'd like one of you to comment on those topics.

MR. VAN HOUWELING: I think you already understand from the examples that I've given that we have a very robust set of connectivity to our major medical centers around the country, and actually they're rather well interconnected. So our problem is as we move out of those major medical centers, the first level is to the community health care centers, and in many of these community health care centers they cannot actually conduct a video conference out of those health care centers which means they can't consult effectively with major medical centers. Furthermore, as we move into the emergency medical

care environment, we haven't built out an adequate mobile infrastructure to support the emergency medical technician in the field working back with the hospital. So it's no just wired infrastructure. Wireless infrastructure is an important part of this.

Another aspect of this is I don't think we have thought carefully enough about the aggregation issues. If what we really need to do is adequate consultation with someone in a home is somewhere in the neighborhood of 10 megabits, then if we have a community health care clinic where we've got a number of doctors who are going to want to have these simultaneously, then we need to raise the bar for that facility up into the neighborhood of several hundred megabits. If you look at the cost of acquiring that kind of connectivity for those primary care centers today, there is no way that the current medical reimbursement system can accommodate those costs. We wind up in a situation where we could do so much more if we found a way to accommodate what we

can already do in major medical centers and move it more broadly out into society.

MR. GARR: I'd like to follow-up on that, Doug. How do the major medical centers fund this? If it doesn't come through reimbursement which I get, it's coming from somewhere.

MR. VAN HOUWELING: This goes back to what Dale said, and it's aggregating multiple uses. So if you were trying to carry all these costs on the top of the practice budget, you couldn't do it. But you've got research activities, you've got instructional activities, all those sources of funds get aggregated in order to support the not-for-profit organizations that deliver the capabilities.

MR. EBERLE: I would add to that too the discussion of broadband, what is broadband? There are definitions that I've heard that I don't consider to be broadband, so when we talk about what the size of that pipe is, what are we actually looking to put in and that infrastructure should the ability to have the future- proofing.

You've talked about gigs and I agree with that, and so there are some definitions that are in place today that are well below a gig that are considered broadband and I would argue that that's not broadband, first. The second element as Dale said in an example of a $12,000 circuit, part of us as a business and some of the exercises we've done where a client has privatized it, it was a mathematical formula. They looked at what they could get from the current environment and it was cheaper to do it a different way or privately because the economics worked that way. So I think having an environment and using all of the constituents out there, the carriers and everybody that's there, but create something that incents the right kind of broadband at the right price points. Some of the incentives and reimbursements today don't incent new broadband, they pay for old broadband, and so I think that money can be re-spent a different way to create an environment where that $12,000 wouldn't happen, and maybe there's more infrastructure money that goes to

create an environment or infrastructure so that that becomes more reasonable. So looking at how it's being spent today, I think there are some disincentives for certain entities to put broadband out there.

DR. KAUSHAL: Just a follow-up question, I think something you touched on in your presentation, Scot, is that we should build broadband for future needs rather than from right now. This is a hard question, but how do you quantify those future needs? That's the million-dollar question.

MR. EBERLE: One example, the Iowa network, we put in and we said a gig to a hospital is going to be perfect. Before we installed it we were at 2, and now we're at 10. So what I would tell you though is to think about the infrastructure that's put in place. Our name has fiber in it. That doesn't mean that we don't wireless. We actually use wireless and we use copper and we use other things. As an example, the capacity of fiber is infinite. It's what you

put on the ends of it that make the difference. So I think making a smart investment, and it's not an easy one-size-fits-all answer to it, but having the appropriate infrastructure that allows you to scale that proportionately, and as you start to scale that, the costs go down. So it's a hard one to answer and we've always tried to engineer a certain way, and that's why I said 100 meg at minimum in access and 10 gig at a middle mile, and I would imagine as Dale looks at Internet2 and National Lambda Rail, those national networks are going to continue to have to expand their capacity because at some point there's a choke point on these networks.

DR. KAUSHAL: Thanks. Maybe just shifting on now to wireless broadband. John, I'd love to further get your comments within that space and more about capabilities, and again this is more about focus within the home and wireless home monitoring, so any perspectives you think around that topic please.

MR. CLAREY: As the 4G networks start to

come and WiMAX starts to come and they starting bringing 10 megabits, some of these applications are going to be able to be utilized. If you can guarantee 10 megs, then you can guarantee that service and they can provide it. I believe that it falls in line with what they're doing on these fiber networks to be able to eventually distribute that final connection through a WiMAX connection or something like that that's at the higher speed.

DR. KAUSHAL: I think also for the benefit of people listening, can you talk a little bit more about the applications that you think wireless broadband will empower, because again, that's a little less in the press these days.

MR. CLAREY: They actually reviewed a number of them on the slides earlier, but as far as some of the critical access hospitals and the smaller hospitals to be able to have a video connection to an expert in another hospital, a teaching hospital or children's hospital or something like that for an expert that they would otherwise not have access to, that opens up those

applications and the need for data and large file transfer is just a prerequisite for the increased efficiencies that can be gained by these things.

MR. ALVERSON: If I could add to that, I think in rural America, and you look at New Mexico, part of the solution is going to be looking at wireless mobile technologies. Putting fiber in the ground is not going to be a realistic option. If you look at the community I mentioned that's looking at a $17,000-per-month bill, they're in the mountains. They're not going to put adequate landlines in at this point. So a lot of the issues about not only aggregation but trying to look at broadband in increments independent of distance and location needs to be an important component of this so that Ruidoso doesn't pay any more than we'd pay in Albuquerque for whatever bandwidth we feel we need and I believe it an be scalable. So can we predict the future as far as how much bandwidth? Probably not. I can imagine as we look at other applications, for instance I've seen some

demonstrations of holograms of individuals in real time. It's incredible bandwidth hungry. We can only imagine the amount of bandwidth we're going to need, and I think we're going to have to work closely not only with government and the FCC, but with industry in being prepared for the next generation of broadband that we're going to see as an important aspect of health care and other applications.

MR. VAN HOUWELING: I'd like to reinforce that point. I sometimes think that the way we're proceeding here is like we're trying to get to the moon by climbing up a tree, and the only way you'll get to the moon by climbing up a tree is to climb back down and start over again. I think we do have to recognize that some of the paths that we have followed traditionally will require starting over, and that's why I think it's so important to think about the base investment, and as you said, its ability to scale.

The second thing I think we need to do is we need to think about sustaining a business

model that continues for continued reinvestment in this infrastructure. We can't think of this as a one-time investment. Everything that we know from our experience at Internet2 is that every 5 to 7 years we have to go back and reinvest in the infrastructure even though 5 to 7 years ago we put in the most powerful infrastructure that we could possibly imagine at the time. This technology continues to move forward. We thought when we started Internet2 that 2-1/2 gigabits for a national connection was a big deal. We're now operating at 800 gigabits and it's been about 10 years with this level of effort and reinvestment. It's all been done with fiber, so we've been able to scale it, but the fact is we've had to reinvest in this technology on a regular basis and we need to make sure that our business plan allows for that.

MR. GARR: That's a great point. I have a couple of other questions that are on a little bit of a different tack. We've talked a lot about deployment issues, I don't want to minimize those,

but I think someone put up a slide that I'm going to use as an example to ask a question and the slide had adoption of electronic medical records by country and it had the United States lagging.

Implicit in that is what's the reason. Why are we lagging? Are we capital constrained? Are we bandwidth constrained, et cetera? I'd love to ask the group if anyone has any perceptive on the adoption side of this problem. I think most of the comments are in the spirit of if we had better infrastructure, people would use it, and I think that's a perfectly valid point of view. But I think there's another way to look at that problem which is that in different parts of the health care system do we have training and adoption, whether it's doctor training, physician's assistants training, nurse training, whatever? If anyone has some thoughts on the adoption side it would be very helpful to offer some comments.

MR. ALVERSON: First of all, to reinforce something I mentioned before, I think it's going to be imperative that the FCC

communicate with other efforts addressing this. The Office of the National Coordinator just came out with the first RFPs on the HIT Regional Extension Centers which is to help primary care providers look at adopting electronic health records, and then the other RFP on heath information exchange. I think there has to be good communication between the user community, the health care provider community, and the various federal efforts underway which are going to be important to enhance adoption of things like electronic health records and to facilitate health information exchange. There are some great thought leaders who are already working in this arena and we just all need to work together, provider in the end, broadband, telemedicine, electronic health records, really should be aimed at improving the health outcomes and wellness of every American, and I would say when you look at it globally, everyone in the world.

There also needs to be careful interchange with the potential adopters. If you

look at diffusion of innovations theory, the adopters have to perceive some advantage, and if you look at electronic health records, not only do we have something that is legible and can better document our health care, but we can add in other things such as decision support tools. No provider I would say today can keep up with the explosion in information and new knowledge in health care and we can build that into these systems so that it adds real value to the provider and to the patient, and I think those are going to be the issues of enhancing adoption. Again I would say let's work closely with the other agencies that are trying to drive that home: How do we enhance adoption? How can we make incentives? That's not only the Office of National Coordinator, that's NTIA, that's USDA and RUS, and that is also CMS. I think there are a lot of issues that have to be addressed to make this of real value to each one of us in this country.

MR. GARR: I think we have a comment

from John.

MR. CLAREY: I'd like to comment on that just a little bit as well. What we've found is the doctors in the hospitals that we deal with work in an average of three different hospitals so that adoption happens when you have a change of behavior and so you're adopting something else. What will happen is if you have an application for a doctor and you give it to him and he likes it in one spot he may use it. If it doesn't work the first time, trying to convince him to do it again, they go right back to where they were. What you find is especially when it comes to these wireless applications, if their wireless system works in one facility and it doesn't work in another, they will not use the application, they'll go back to whatever it was they were doing before. In order to get adoption of these things, you need to change behavior and in order to change behavior, the first time you do it it had better work.

What our hospitals are wanting to do is have all the devices work in every hospital so

that the doctors when they come in, they can use the same device in each facility that they are in, if they're at somebody's residence, wherever it is they are, they could be at a baseball game, they need to be able to have this stuff work or they won't adopt it. If it works part of the time they won't do it.

DR. KAUSHAL: Thanks. We're now going to shift tack and get some questions from the audience and people at home.

MR. PRASANNAPPA: I just want to add to adoption.

DR. KAUSHAL: One last comment.

MR. PRASANNAPPA: Affordability and reliability is the key issue here. If a physician cannot rely on a network, they are not going to use any of them. Similarly, I don't think we should forget the consumer side of health care which is the end user, and adoption by them is also very critical. We're talking about personal health records and to be able to upload images from the comfort of your home, and that just

cannot happen without the reliable network.

DR. KAUSHAL: Thanks. There are cards being distributed, so if anyone wants to write questions, we already have some already. Question number one is, "Do you see the USAF Rural Health Care Pilot Program dovetailing with broadband deployment under the Agriculture and Commerce Departments' Broadband Stimulus Programs?"

MR. ALVERSON: Those of us who are in the trenches strongly believe that these need to be coordinated. I think we had a lot of hope that the BTOP and the BIP program under the Department of Commerce and NTIA and then USDA/RUS could be complementary. I still believe they can be. I think trying to understand what it would be like to be in the shoes of all of you that you're on a very fast track. There are a lot of demands being put on a lot of agencies and a lot of demand to distribute the ERA funds from the stimulus package, but I think this is a time maybe we need to pause and look at how can we make these more complementary so people can take full advantage of

these programs. In fact, we had talked about the Rural Health Care Pilot Program. Is it possible that the NTIA might be used as part of the match or vice versa? It was clear that there just hadn't been enough time to consider those things. I think now is the time to do that. So I believe they should be complementary and could be complementary.

DR. KAUSHAL: Ernesto, have you got any more questions?

MR. BECKFORD: No. They've all been sent to you.

DR. KAUSHAL: Next question, "When the Rural Health Pilot started, HHS signed on as a co-sponsor, yet they seem to be absent. Is there any coordination taking place across agencies so the program can better support federal health goals and initiatives?" This may be to you, Ernesto.

MR. BECKFORD: I should answer the question?

DR. KAUSHAL: I'm just trying to read

the writing.

MR. GARR: We have a highly encrypted handwriting.

DR. KAUSHAL: It should be done electronically.

MR. VAN HOUWELING: If we had electronic health records --

MR. GARR: You'd be able to read that. That would be great.

DR. KAUSHAL: Do we think or do we realize the necessary investment to expand needed broadband infrastructure to support EMR and telemedicine to come from the health care industry, the federal government or from other sources, and over what period of time?"

MR. GARR: I'd like to put that one in context a little bit which is to say anytime you spend time with the health care industry, it's amazing what it can do. It is amazing, but it's very expensive. So the question is, in your experiences, what are the ideas you have on financing for a lot of the things that we're

talking about, whether it's health care records or incredibly fast connections between institutions, et cetera?

MR. CLAREY: I could start with that a little bit. I have some experience in private equity and if you look at a private equity perspective on building out these networks, there just isn't the return, and over time, if you just allowed it to go, they would all be built out, but if the goal of the government and if the goal of the Obama Administration is to accelerate the development of technology-based health care systems, then you're going to need to push that and stimulate it, so that what happens is is you won't get that money coming from the private equity world. Then if you look at tax breaks in the case of many of our groups, they're nonprofits, so you really can't incentivize them by some kind of a tax break associated with building out a network. So I think at the end of the day the government needs to be a big pusher in these types of things in order to actually make

this stuff happen if the goal is to accelerate the adoption of these programs.

MR. VAN HOUWELING: I guess my sense here is I would like to go back to something that's already been said a couple of times. We won't be successful here if we try to place the full burden of this infrastructure on any one industry. We absolutely have to find a way to put the institutions in place that provide infrastructure broadly to all of the necessary uses so that in fact we can share the costs of this infrastructure across those uses. I'm concerned that we haven't yet set as a national goal implementing the policy for broadband so that it is designed from the beginning to be funded multi-sectorally as opposed to one industry at a time.

MR. ALVERSON: From my standpoint, we have to look at this as system-wide and when you start looking at it system-wide, it brings in many players. It brings in the provider system, it brings in patients, it brings industry and it

brings government. One of the things that I think we have to be able to show is, and I think you mentioned at the very beginning when we were looking at broadband, how do we do things for the health care system that's cost-effective. A lot of what we could do with enhancing access to health care is we improve continuity, we make health care less episodic, and the important thing is that we improve outcomes. I can give you some examples. If you look at the aging population and chronic disease, there is evidence now showing that with early detection of problems, earlier intervention, and a lot of this requires telemedicine, the actual aspect of being able to interact with the provider and a patient, can avoid more costly subsequent costly complications of these diseases. This has been shown in chronic congestive heart failure with home monitoring. It's been shown with diabetes. We're seeing it with other issues. What has to be factored in is the cost avoidance and savings to the system as a whole. The Congressional Budget Office stated in

the review of the bills coming out for health care reform that telemedicine, for instance, was going to be incredibly costly. When you factor in the cost of implementation, that's a death knell. What you have to look at is the cost-avoidance to this country that not only improves the quality of care provided and the wellness of people, but avoids more costly care that's required if we don't provide better access, so that has to be factored in and we have to look at it system-wide. That's how you'll pay for it so that no longer will people say we spend more of our gross domestic product than any other country in the world on health care but our outcomes aren't that much better and in some cases worse.

We really have to look at it system-wide, so if FCC is going to look at broadband for health care, we have to make sure that we work with the health care community, the consumer and industry to make sure that we have systems in place that can actually measure the improvement in outcomes and the actual

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cost-savings, and I believe they're there and if we look at it system-wide then no longer can the Congressional Budget Office say this is going to cost millions and millions of dollars to this country, they're actually going to save millions and millions of dollars and improve quality of health.

DR. KAUSHAL: Thank you very much.

MR. GARR: We had noticed some activity on Capitol Hill around this, so you're right.

I had a quick question about fiber. It's been mentioned several times. I'm going to bridge this off to comments about broadband definition, I'm going to offer a short commercial, and then I'd like to ask a question about fiber. The short commercial is we have a public notice out asking for comments to help us define broadband, so you're spot on, this is an issue and it's something that needs to be addressed, and I would ask you to look at the questions we've asked and if you have some idea, we're all ears.

Underneath a lot of this, a lot of

what's been discussed is a lot of fiber in the ground in lots of different places. We're very curious in your experiences as to where has the barrier been where it literally is stuff in the ground that's missing? There's been a lot of discussion about we can't finance it, we need more speed which may be a service provider issue, maybe an issue with the types of hardware that we have on the edges of the network, it may be a service-level agreement that we don't have with someone that we wish we had, but where have we found barriers of the core infrastructure? And what opportunities do you see to try and push fiber into the system in different ways?

MR. EBERLE: A couple of comments on it. First, where are the gaps? One of the examples I cited earlier today was the Nebraska panhandle. A lot of the due diligence we do before we do any network is we look at what's available and what's out there and try to leverage and work with existing carriers to try to identify that. So in certain geography, and I think Dale has made a

comment about some of the areas that you have, it's not there, there's one element to it, so I would say that's an example of that.

The second area I would say is a lot of times it's in the last-mile environment. Some of these smaller communities where the infrastructure was the smaller phone company that's always been there and they're primarily copper plant and not a lot of upgrades, so there's a limitation on some of that plant that's there today. I've seen a bigger development in the middle-mile networks because there is availability to either build or buy in some form or fashion or partner and find national networks to do that with, so I think the issue is there are some real rural areas that have it. Then secondly, I think that last-mile component to it is one of the biggest challenges because we can create a pretty healthy middle-mile network and find the right kind of economic structure and the right kind of sharing. There are lots of ways to skin that. But when you get down to that last mile, I think wireless plays a

big play in that with the evolution of where that's going, and secondly, I think may respending some of the dollars that happen at the last mile a little differently and incent that the right way to put the right kind of infrastructure in place can be a positive way to spend some of the funds.

DR. KAUSHAL: Due to timing constraints, I think that's the end of our first panel. I'd like to thank everyone for participating. I think we had some really great and insightful conversations. We now have I think about a 15-minute break before the second panel.

MR. GARR: Thanks, everybody.

(Recess)

DR. KAUSHAL: We're now going to start with our second panel. Aneesh will be joining us, but we're going to put him now maybe last.

First of all, Dr. Kaveh Safavi who runs the Healthcare Business Solutions Group at Cisco.

DR. SAFAVI: My name is Kaveh Safavi. Cisco is a technology and communications company and we focus on connection people together with

information and resources that they need to do their work. I think this conversation today is very important because one of the big issues that we observe is that the challenging triangle of access, affordability and quality seems to be locked, every time we pull on one end of the triangle the other two get twisted, and our view is that until we change some of the fundamentals including the notion of supply and demand, we're not going to make progress. One of the ways to do that is to eliminate one of the established, basic assumptions in health care which is that every time good care occurs there needs to be some form of physical proximity between the expert and the patient. I think one of the things I'll take you through and show you is that we have reached a point now where you can demonstrate the fact that I many cases you can achieve of level of care that is as good as face-to-face care. Now the question is how do we drive adoption which will be the subject of this panel.

In our view there are five elements that

will ultimately to promote or are necessary to drive adoption of forms of advanced technologies. One of them is that the technology is both user friendly and also sufficiently immersive that it doesn't interfere with the experience of care that patients and doctors are engaged in. The second is that there is sufficient amount of broadband connectivity, the subject of which the FCC has been dealing with for some time and the panel talked about. The third is there has to be some form of an economic incentive or reimbursement model for which there is a limited one, and that's a subject of this panel as well. The fourth is that there has to be a provider system, a delivery system, that is reorganized to take advantage of these technologies. I'll give you an example of that in a moment. Then finally there are some regulatory issues that also have to be addressed, things like state licensure issues or practice of medicine laws, issues that prevent taking advantage of this technology even if it were there.

Technology has actually matured to a level where we can demonstrate today that both doctors and patients in certain situations, in situations that have historically only been addressable by face-to-face care, find that remote can be or telemedicine-delivered care can be the same or better than a face-to-face visit. I want to make a point of this because technology is necessary but not sufficient as we talked about, but historically telemedicine experience, patients have usually described their level of satisfaction as being about 60 percent compared to face-to-face where their level of satisfaction tends to be 90 percent. What we've demonstrated is that if you combine a very high fidelity ability to hear and see with the ability to share information with remote diagnostic equipment, examine the patient at a distance and bring some information from the outside, you will get 90 percent satisfaction levels. That has not been seen before, and that has big implications because now we're not talking about just care for patients who have access to

care, but we provide a competitive alternative for patients even if they're in an already-served market.

That level of interaction does have certain requirements. From a connectivity perspective, the examples that we have seen now have about 10 megabits of connectivity in both directions. That connectivity has to be very secure and stable and dedicated. The only way to get the patient and the physical level of acceptance high enough is to make sure there is nothing interrupting. The other part of it is that this is typically not just the ability to hear and see, but it includes remote diagnostic equipment. Remote diagnostic equipment does consume a fair amount of bandwidth and even as the marketplace solves for bandwidth around audio and video, there needs to be this necessary understanding that other technologies are going to consume some of that bandwidth as well.

The second point around this experience is that it's not going to be good enough to simply

connect one doctor to one patient, and if you look at our vision here which is connecting multiple settings of care as well as multiple sources of information, this is what you discover. We've done economic modeling that looks at simply taking a doctor and a patient relationship and separating them in space, but there is only so much work that a doctor can do and there is so much productivity that you can extract out of it. We're really only going to make a quantum change if we can figure out how to allow a many-to-many interaction and that will allow us to do things like balance the load, let's just say for example a relatively rare specialty, one that might treat children with behavioral conditions like a psychiatrist, some of these physicians are used, some of them are not used. If you can figure out a way to load balance that group of physicians across a large group of patients, then you can begin to get some efficiencies that aren't going to be found in a single doctor, single patient interaction so that there is a level of participation that will not be

achieved if you just have a couple of points connected in even the most robust way, you need to have broad-based broadband connectivity.

The final point that I want to make is on the issue of reimbursement. There are a couple of issues that have to be addressed as far as we can see. Right now there are models for reimbursement in the rural areas. There is no real model right now for reimbursement for care based in the home. There is also no model for reimbursement where you have multiple physician participation and physician-to- physician collaboration. So these are going to have to be issues that get addressed in addition to the traditional notion of home.

The regulatory issues that we've talked about such as practice of medicine and licensure are interesting because they're state issues. It is possible for example that we might be able to think about experimenting with Medicaid and Medicaid reimbursement at least to permit some level of flexibility and allow some level of

experimentation such that we can begin to see what we can do to solve the problem for Medicaid beneficiaries who right now, frankly, are unserved even in a metropolitan area.

I think that there is some role for government here, but there is also a role for the private sector, and I would argue that the presence of a stable and high- bandwidth network is a necessary step, it's not sufficient, but in the absence of it the market is not going to move in that direction. Thank you.

DR. KAUSHAL: Thank you very much. Next we have Protima Advani who is the Practice Manager of the IT Insights Program at the Advisory Board Company.

MS. ADVANI: Thank you. Good afternoon, everybody. Thanks for having us here. As the Practice Manager for the IT Insights Program at the Advisory Board, my primary role is to oversee the research that is requested by hospital members around IT strategy. So as you an imagine, right now the number one issue for everybody is the

meaningful use definition and the incentives that go with this. Obviously, that's not the only thing that has come to the forefront as a result of the stimulus bill. Telemedicine, as well know, the broadband networks did receive stimulus funding and obviously this is something we are tracking very closely in terms of how is this going to change hospital and health system IT strategy moving forward now that there is actually an infusion of federal dollars in this space. So I'm hoping I can share with you what we are seeing in the evolution of telemedicine, what benefits we have seen through several studies, but despite these benefits, what are the barriers that are limiting hospitals and health systems in making these investments, and physicians from adopting them, and there might be some ways we can overcome some of these barriers.

Over the last decade maybe there has been the expansion of the use of telemedicine. There are several applications today. It's no longer just phone-to-phone consults. There is

Internet use, there is video conferencing. We have even seen people use robotic technology to do surgery in a remote setting. So the applications for telemedicine have clearly grown. They are allowing us to treat people in different locations with very little human contact. They are also no longer just for chronic care management. What started out as a way of treating chronic care patient, today if you look at the bottom of this slide, every possible service line at the hospital is being touched by telemedicine, so that the potential there is enormous. And it's having some real benefits for the industry at large. You are not only able to provide greater access to care, so there are people who would never have received this kind of care living where they do today, but also you are providing round-the-clock coverage, something that you can't afford in some of the remote areas especially when you have a shortage of specialists, an aging workforce in the health care industry, and numerous people needing that kind of care. Clearly, telemedicine has already

started to reduce some of the disparities that have existed in health care because we are able to let technology reach so many people so quickly.

It's not just about improving access though. There are several studies out there. I just listed data from a couple that clearly show that just putting in telemedicine has helped reduce rehospitalizations in congestive heart failure patients, it has reduced EDU visits, and reduced even admissions to nursing homes, so that it is not just improving access, it is improving outcomes in care, but also reducing the cost, something that this nation is very focused on when you think about the high cost of care, telemedicine can really help bring that cost down.

There are obviously several other benefits. Not only are patients happier as Dr. Safavi just mentioned, but it's also the reality that hospitals benefit. You're investing in these service lines and sometimes you don't have that kind of volume in your own market, but this grows your referral streams and allows you to get the

benefit of additional patients, so essentially a higher ROI on your service line investment.

Despite these benefits, this is one thing that is not a priority for hospitals. Every year as part of our research process we are always talking to hospitals and asking, What is the number one priority for you? What would you like us to research for you? And in the last 4 years, telemedicine has not made the top 20 list. So it just gives you the perspective that despite all of these benefits, despite all the success stories, despite the fact that some of the barriers in terms of technology are dropping and technology is becoming almost like a utility, it is just not one of those priorities for hospitals, and let's talk about some of the reasons why.

The number one barrier, no question about it, is financial constraints. Hospitals are already spending millions of dollars on clinical technologies and now more recently obviously on health IT as well, so when it comes to a telemedicine program there are not only

significant up-front costs of setting up the program, but the ongoing costs of providing the costs of providing the labor to support this program as well as the secure broadband network that will be required to exchange information securely so that you're not violating any of the HIPAA compliance rules. While this is not the most unpalatable cost, sometimes hospitals are running into situations where they do find remote facilities that they would like to partner with but those facilities have very antiquated systems that either need to be replaced or upgraded altogether so that that compounds the cost the hospital bears. But I think what's been the biggest deal breaker when you talk to hospital executives is the reimbursement scenario. If you look at all the data on this page, when it comes to telemedicine reimbursement, it just varies so much by state as well as by payer, with Medicare having only 27 states to date reimbursing telemedicine services, and when it comes to the private payer industry as well. The latest number

is 57 percent of private payers were reimbursing some form of telemedicine and not all services. Then when it comes to Medicare, Medicare is clearly only offering it for patients in MSAs, the medical shortage areas, or in areas with rural health professional shortages. What's interesting and counterintuitive to me in that situation is the whole point of having professional shortage areas is for PCP shortages, but what you're trying to achieve through telemedicine is actually specialist care, so I don't even understand why Medicare would use that as one of their deciding factors for whether to offer or reimburse a service or not. Needless to say, there is a ton of potential but we're not helping it especially on the reimbursement front. Another big factor obviously is the legal liability. I know you just mentioned the factor that physicians don't want to have to deal with the differences in state licensing laws, but from a hospital perspective, the burden to be compliant with HIPAA and protect all the patient data within their four walls is

big enough, it's expanding with the more recent stimulus mandates, but it's only going to get a lot more if they have to protect all of this data going beyond their four walls to a remote facility that they have little control over, so that is definitely a concern, and from a physician's perspective, there is also the concern of malpractice. To date I believe there are only one or two cases, so they don't really have a good sense of if I get prosecuted for this, what is my liability here, so that's obviously not helping adoption.

Finally, just my eye on the clock, I'm not going to get into cultural changes, but as you can imagine, there's a huge shift in culture for physicians both adopting technology which is disruptive to their workflow, but also getting away from this mindset that I have to have a face-to-face interaction to be in control of my patient's care.

The question is that there is all this value. We as an industry are trying in every way

to make care more affordable and make it more accessible to people, there is the potential of telemedicine and what can we as an industry really think about as a policy perspective to make this happen. Fortunately for us there are a few forces that are converging in favor of hospitals. You have the federal stimulus dollars and you have CMS's recent focus on the 30-day readmission rate. Now hospitals realize that one of the ways they are going to have to manage care is through telemedicine if they want to keep patients out of their buildings at least at that 30-day readmission rate so that they don't lose payment. In fact, one study showed an average 250-bed hospital that has about 1,150 CHF Medicaid patients over the year. If those patient should come back in, on average they would see 265 of those patients back in 30 days and the hospital would lose over $1.5 million in CMS denials, so it's a real cost for hospitals now to avoid this.

Of course, all the focus on health reform is also definitely driving hospitals to

rethink the care continuum because if you're going go toward bundled payments, an accountable care organization is another factor that's going to drive hospitals to really look at the care continuum so they can better manage a patient's care. But one could argue that hospitals then will only go after their immediate network because at the end of the day there is no liability on them for remote areas which is not part of their patient population. What's really going to need to change there is the reimbursement structure, not just reimbursing them for telemedicine services, but also if they are going to reduce admissions, they are going to reduce ED visits, they are going to get a hit on their bottom line in that they are not going to see the same revenues they did, in essence by improving care they're getting hit by reduced revenues, so is there a way we can actually incent them for improving care by compensating them for the loss that they see in terms of revenues? The one observation I also notice from other things that

have happened from CMS in driving adoption has been on the CMS front, there is a CED program for new devices. Back when drug-eluting stents came out, they offered to reimburse it for hospitals as an avenue for collecting data, so it's too early but it's a cutting-edge technology, let's reimburse it, but you will give us data which will help us test the efficacy of this new device. Could we consider something like that in the telemedicine space? There are new emerging technologies in telemedicine every single day that hit the news. Could we be looking at some of these as an effective way of managing the cost of care, improving outcomes and reducing inefficiency in the system and actually reimburse them on a similar CED-like program? I am way over, so I'm going to skip the last slide.

Finally, on the legal liability front, this obviously adds a burden on hospitals and are there ways that we can prioritize the development of standards both for clinical protocols in terms of dealing with patients (inaudible) but also the

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exchange of data so that we are reducing the risk liability for hospitals that offers to provide this care in a remote setting. Thank you.

DR. KAUSHAL: Many thanks. Next we have Dr. Karen Rheuban who is a pediatric cardiologist and is also the Founding Medical Director of the University of Virginia's Office of Telemedicine.

DR. RHEUBAN: Thank you. Also like Dale, I am the President of the American Telemedicine Association and we're thrilled to have pediatricians at the helm, and it's a privilege to be here on behalf of all of my constituencies, UVA and ATA as well, and John Linkous is here from ATA too.

I think one of the major questions we have to ask is, If you build it, will they come? The FCC has committed a tremendous amount of investment in rural and other broadband applications, schools and libraries, et cetera, but what are the barriers? What are we seeing that is causing us not to utilize these networks? I think that Protima had some very excellent

points that she made.

Telehealth applications are extensive. They include video conferencing for patient care, store and forward or asynchronous transmission of patient images and data such as teleradiology, telepharmacy applications, remote monitoring and home telehealth, mobile health applications are included within that using wireless technologies, health information exchange transferring information from hospital to hospital, clinic to hospital, believe me I'd be certainly pleased not to get another request for a telemedicine via fax, emergency preparedness and disease surveillance, and of course distance learning for patients, for health professionals, for our medical students.

Partnerships to improve health can include a host of different constituencies, with academic connections and academic community hospital linkages. The Department of Defense and Department of Veterans Affairs have heavily invested in telemedicine, as are rural clinics such as our federally qualified health centers,

veterans, CBOP, free clinics, health departments, correctional facilities, school health applications, nursing homes, with home telehealth allowing people to age gracefully at home in place. The workplace is another great place for telemedicine applications, and medical offices and retail clinics, all applications that have embraced telehealth.

What are all about? We are about enhancing access to care and this is a slide, Aneesh has been there, the Remote Area Medical Clinic in southwest Virginia. The Remote Area Medical Clinic is all over the country now and every time they set up, thousands and thousands of unserved patients show up, and as Protima said, it's not even that they don't necessarily have access to primary care, many of these individuals are actually insured. In the clinic in Virginia, almost 50 percent of our patients lining up are insured Virginians who still don't have access to care for a host of reasons, and this is what we're all about, trying to solve this solution. So it

clearly goes beyond the Federal Communications Commission, but you are a very important player in this game for us.

Why do telehealth? For patients, it's the benefits of timely access to locally unavailable services and improved triage of patients when transfer is required. It's much better to have the specialists involved from the very git-go. Dale is a neonatologist and I'm a pediatric cardiologist and our patients arrive in better shape when they come with telehealth as part of the initial evaluation, with improved quality of care, and with reduced readmission for the same diagnosis, you're hearing about this again and again. It is an important priority for our government, with improved chronic disease management, and we can spare the patient the burden and cost of unnecessary travel.

The benefits for health professionals. We have tremendous workforce shortages we're facing and an aging medical profession. This gives professionals access to consultative

services. Each consultation is inherently educational. The referring physician and provider learn from the telehealth encounter. It provides them access to continuing medical education. There's a mandate in most states for renewal of our licenses that we have CME, but if you have to travel a long distance, people don't get it. And it reduces the sense of isolation of our rural health providers, and that's a continual problem that we hear.

For rural communities, we know that more than 85 percent of patients remain in the local community environment when they're served via telehealth and that has tremendous benefits because care in the community is at a lower cost, and it enhances the health care and local economic development models in that community by keeping the community hospital open. If a patient stays in the hospital, that keeps the hospital viable, and the hospital is often the major employer in any community. So we believe that telehealth is good for rural development and for society with

lower cost of care, improved health care outcomes, and we even like to say that telehealth is a green technology because you don't burn gasoline when you're using telehealth.

I want to show some quick innovative applications. Telehealth can be used to reduce infant mortality. There's a phenomenal project that's based in Arkansas called the Arkansas Angles. They have demonstrated a 26 percent reduction in neonatal mortality by using telemedicine to provide early access to prenatal care. And thanks to our past Secretary of Technology, our institution, the University of Virginia, has launched a similar program using funding form our governor's office, the Productivity Investment Fund. It's well known to work for congenital heart disease, childhood asthma, childhood obesity, with school health and daycare applications that present trips to the emergency room and keep kids in the daycare setting and parents at work.

Other applications that have become

mainstream are teleophthalmology screening for diabetic retinopathy, the number one cause of blindness, and yet it's not a covered service under Medicare or screening for retinopathy of prematurity. There's a great image. That's the type of image, a digital image that can be sent over the broadband communications link. With teledermatology, we face tremendous shortages in dermatologists with parts of Virginia having to wait for 6 months to a dermatologist, and through telemedicine we can improve the efficiency of our dermatology population. As for telemental-health, there are tremendous shortages in mental-health providers. And many of the specialty societies have partnered to develop standards, and I'm pleased to have my colleague Nina who has done a tremendous amount of work to develop these standards with the specialty societies.

Other applications including acute stroke intervention. The American Heart Association and Stroke Association have now created a consensus statement that says that

telemedicine is an important tool in the care of patients with stroke. Time is brain, and if you can get TPA within 3 hours of onset of the stroke, we can spare the brain, so it's an important tool. With mobile digital mammography applications you can broadcast the mammograms back to the interpreters to the mammographers either wirelessly, with satellite technologies or using land-based communications services. That means early diagnosis of breast cancer and lower cost of care. Then we should also not forget remote access to clinical trials and community- based participatory research, and using telemedicine technologies with our rural and community-based partners is a terrific tool to increase access to these types of activities.

Why are we doing this? You've heard reference again to 30-day readmission for the same diagnosis. There was a publication, the "New England Journal of Medicine," that says that Medicare in 2004 $17.4 billion on unplanned hospitalizations. For hospitalizations for the

same DRG, 30 days is 20 percent of patients, within 90 days it's 34 percent and within a year it's 56 percent of patients. Remote monitoring and home telemedicine technologies can reduce that readmission rate. It's been well proven for heart failure, chronic lung disease, diabetes, and it's been proven in vertically and horizontally integrated environments such as the VA in their Care, Coordination and Telemedicine Program, with a 19 percent reduction in hospital admissions, a 25 percent in reduction in hospital days.

How can the federal government help us? The federal government has spent billions of dollars in telemedicine technologies and rural broadband and yet we still have problems with Medicare reimbursement. Medicare reimbursement is only for the rural Medicare beneficiaries and that means 79 percent of Americans who are Medicare beneficiaries don't have access to telemedicine technologies. I think it was Dale who mentioned the challenge of the Congressional Budget Office in the scoring of these technologies. CBO scored

telemedicine at hundreds of millions of dollars with BIPA 2000, and yet over the ensuing 5 years spent only $2 million per year covering telemedicine services, that's hundreds of millions of dollars scored and $2 million a year in reimbursements. Store and forward is only for Alaska and for Hawaii. There's a lot that can be accomplished with store-and- forward technologies. Medicare don't have a federal mandate. I believe there are more than 30 to 35 Medicare programs that are reimbursing some services, and in Virginia we're very fortunate because we have rural and urban. Other payers, again the VA and the Department of Defense, do pay, but the private pay environment is very limited in terms of what they reimburse, so there's a lot that can be done.

Dale mentioned alignment of federal policies and definitions and we face different definitions of rural. I can get a grant from the federal government to set up a telemedicine system at a federally qualified health center, under USDA rules, rural-rural, under the Appalachia Regional

Commission it's rural-rural, but they're considered a metropolitan statistical area because of their adjacency to a city of 60,000 in the next state and so we can't be reimbursed to be provide that service. We really need to fix this. Medicare has a conditions of participation standards for hospitals which require that every one of our doctors be credentialed and privileged at every single hospital in which we serve. That's crazy. First of all, it's expensive to credential and privilege a physician. There is no one in that community hospital who really has the ability to credential and privilege our doctors. That's the whole reason they need us because they don't have those services available. So that's another CMS effort that really needs to be dealt with, and it's counter to the Joint Commission's Telehealth Standards. So we have recommendations for adoption, it will drive adoption in health care payments. There are other issues. You've heard about licensure and telecommunications costs, and we are very grateful to the FCC for the

Rural Health Care Support Mechanism for the pilot. It just needs a little bit of work. We do know that telemedicine providers nationwide have said thank you to the FCC for giving us this access to affordable broadband. Now we just need to fix it. We also need to fund research projects, that's NIH, cost-effectiveness and savings, that's the Office of the National Coordinator, the Agency for Health Care Research and Quality, industry standards working with NIST, and so we have a great opportunity before us with ARRA and we just sustain this federal investment. We need to make it work with sound federal policies to facilitate sustainability and integration into mainstream medicine will make it all work. Thank you.

DR. KAUSHAL: Thank you very much. Next we have Nina Antoniotti who is the Program Director at the Marshfield Clinic Telehealth Network.

DR. ANTONIOTTI: Thank you. This is an interesting panel to be on because I disagree with something almost every has said. I run a

telemedicine program in Wisconsin. We are very successful. We have excellent reimbursement. We have broadband out the wazoo and that's not for lack of trying, but we do have some critical issues that I believe this group can really be effective in changing for us.

I will leave here tonight and tomorrow I will present to patients, one a pediatric neurology patient and the adult I think is pulmonary medicine, from a rural clinic, in the afternoon I will meet with some docs to set up a practice, and in the late afternoon I will work on setting up eight nursing homes as sites to receive telehealth services. So if there's any part of telehealth that hasn't been touched by me, I'm not sure I know what it is.

What I want to do today is something a little bit different than everybody else has done. I'm going to take you with me out there where telehealth is practiced and show you a little bit about what all of this really looks like, and when you think about public policy and what needs to

change, you have that picture in your mind.

Marshfield Clinic is a physician service organization, a multispecialty clinic. We have 43 regional centers. We are the only service health care provider in 90 percent of central and north-central Wisconsin. Seventy percent of the care we deliver out of $3.5 million encounters a year, and that's not labs and X-rays, that's just seeing patients is in rural areas. We do that with about 1,100 physicians and allied practitioners. We are very fortunate to have built over the last 45 years some infrastructure that helps support delivering care at a distance. That's what we've all been talking about today, how do you get this job done at a distance when the needs are so overwhelming? We have our own electronic medical record that is probably one of the first or only noncommercially delivered medical record in the country. We developed it because we needed to take better care of patients, and we needed to do that at a distance. We have all of this infrastructure in place that you see

on the slide so that anywhere in north-central Wisconsin, a phone call to another clinic is a five-digit phone call. All of our long distance costs 3 cents a minute. The minimum bandwidth we have between a tiny, tiny, tiny little clinic with a nurse practitioner 3 days is a 10 meg fiber connection and that again isn't without a lot of sweat, blood and guts on the road hammering telecommunications carriers and getting pricing that at least makes it affordable for us. We've spent hundreds of millions of dollars over the last 40 years getting this done, and we spent about $3 million a year just in telecommunications costs just to get this done.

We also provide access to patients through our Web portal so they can see parts of their medical record, they can leave information for providers, they can download information about their blood pressure and things like that right into the electronic medical record, and they can also access health information so that they can take better care of themselves. We believe that

telehealth is really a tool for access. Like Karen has said and Protima, it's really about providing access not only for patients to practitioners, but also practitioners to patients, and that's where it's not feasible or practical or realistic to have the practitioner or the patient travel. If you're a pediatric cardiologist and you've got one patient in Ladysmith and that patient cannot travel to see you, you cannot do outreach there. The environment of health care does not support that. We need to look at and use this technology to provide access in different ways.

These are all the services that Marshfield Clinic provides, and when you look at that some of those require very complex physical exams during an interactive clinical consult. Others are pretty much straightforward, checking in, exchanging information verbally, making face-to-face contact which you do when you use telehealth. So that the needs are different in each of those, but we have about 45 clinical

services, interactively we see about 4,000 patients a year, and we do this everywhere. One of the questions in the earlier panel was, Where do you need broadband? You need it everywhere. You need it in the cities, you need it in the senior citizens' centers, you need it in the schools, you need it in the Head Start clinics. I'll give you a little bit of an example of our Head Start program a little bit later. But again, anywhere a person has health care needs is where we need to be supplying broadband access, and we need to do that at speeds that support the clinical activity. Obviously as you go up the spectrum it gets more expensive, but we do everything at 384. That's a lot lower than some of the suggestions that have been made today, but again you pick the bandwidth to meet the clinical need.

This is an example of a telehealth exam room. It's interesting that hospitals perceive that this costs a lot of money. You can build this for under $10,000, and if you have to bring

the line in-house yourself because no one else will help that fund that for you, that's an additional about $5,000, so with $15,000 you can put this in place and our patients have access to specialty services. So it's not that much money, and I'll talk a little bit about some of the ways we can fund that. This is what the doc's side looks like. That's about $200. Again, there are ways of getting this done that are cost-effective so that we can leverage the funding we do have to get patients seen.

Here is where your big bucks are sometimes, and that's in your clinical exam technologies, but this is what they do. This is a picture that I get 300 miles away from a clinic on my computer that's much, much better than I can see in person, and these are the types of images that we can either send, store and forward as a digital image attached to an email, or we can show them live through a 10 meg connection at 512 kilobits. Anytime you need stethoscopy, the whole changes a little bit in that you really need to

have control over that bandwidth and the quality of service, so again that's more about bringing that line in-house and having more control over it than I might if I'm using the Badger Network in the State of Wisconsin because again stethoscopy is a clinical diagnostic tool and I need to be able to ensure that the transmission speeds and the bandwidth in that network are sufficient to allow me to provide good clinical quality data.

We've talked a little bit about telestroke. Telestroke really is an interesting animal because this is one time where multiple different organizations come together and work together, share bandwidth and share information across that network in order to reduce the morbidity and mortality rates associated with acute ischemic stroke. What this really requires is significant bandwidth authentication systems, gateways and other types of hardware that may not normally be needed in traditional clinical telemedicine activities because the key here is getting docs in from their houses. To get docs in

from their houses with video and access to electronic medical records requires a whole level of sophistication that we might not need in traditional outpatient telemedicine. Telepharmacy is another application where we're leveraging our clinical specialists in a way that we couldn't otherwise and patients would go without care, and that's really what telehealth is about for us in Wisconsin and many other areas, that patients simply would go without care. We have a sterile products pharmacy where we have five specialty pharmacists for 43 regional centers and they cover seven regional cancer centers from three locations over telepharmacy so that those patients can get chemotherapy, they can have access to clinical trials, that if their side effects or questions, the local practitioners can meet right with that specialty pharmacist. Because of that experience asked what about all the communities that don't have retail pharmacies? What about those patients who go without their medications for 2 or 3 days because they have to wait for something to get

mailed or they have to travel while they're ill to get prescriptions? Because of our experience here, we were able to change public policy in Wisconsin and we now have telepharmacy legislation on the books. Again, our experiences can easily drive public policy if people know what we're doing and how easy this works and that the clinical benefits are amazing.

As for our Head Start program, we got grant funding which I think should always be venture capital, and we linked 10 Head Start centers for medical and dental applications. The reason we did this is this. Every day about 15,000 kids who are 6 to 8 years old in Wisconsin are sitting in classrooms with their mouths hurting, so what we did was we connected them to dental screening and prescriptive exams, and you can see some of those clinical outcomes there. The number of kids who floss and brush goes up dramatically, the number of kids who have access to sealants goes up, and over again and over again we have clinical applications and clinical

outcomes that are proven to improve the health and well-being of our communities.

Here is the problem with that: 10 Head Start sites, 10 T-1's at about $13,000 a month, $156,000 a year. USAC funding brings that down to about $2,800 a month. The grant funding is going to kind of run out here pretty soon. When I went to the Head Start director and I said you got to start thinking about taking this over, she asked, "How much talking about?" I said $2,800. They didn't speak for a full 5 minutes. So this is going to seriously put this program at risk and our kids are going to go back to sitting in classrooms 2 years from now with their mouths hurting. This is where we can have impact in trying to reduce the costs. We can get the access. We've talked to our telecos. We've convinced them to build out, and I think we should actually go to the farthest point and build back. With this building from the center out, let's go out there and build back and I think that would work a lot better. This is an example of really

where the costs are going to be an issue in eliminating access.

One of the questions posed to this panel was, How can doctors and patients easily learn how to use telemedicine? I think this is really a no-brainer. You just have to get telehealth to them. We have no problem with patients wanting to use this. Our patient satisfaction is 89 percent and that's about 20 percentage points higher than in-person care, because we think about what it is to be a patient and a provider in that health care interaction and then we make telehealth make that work. We really just need to get telehealth out there to them through all of those things that we've been talking about today.

There are well-established telehealth experts all over the country. I get calls every week. I help about 10 programs every year, and when I'm doing with them they are successful in telehealth. So if there are 10 of me out there, that's 100 programs a year that are going to get started. We need to be connecting these people

together in ways that are meaningful and useful, and the way to do that is through organizations like the American Telemedicine Association. There is not another organization in the world that has more impact in moving physicians and patients forward in using telehealth and anything that government agencies can do to support nonprofit organizations like American Telemedicine in promoting telemedicine, we should be thinking about those things.

Then the other issue is many telehealth entrepreneurs. People are using Skype, MySpace, they're taking junk out of the garage and developing technologies that actually work well that are really revolutionizing how we're doing this. Another question is about barriers to telemedicine and we've heard a lot about reimbursement. There are a couple of things going on there that I'll talk about, organizational readiness, that people just need to understand that they can do this, hospitals need to understand how easy this is to do. Broadband

costs for private practices need to be supported, and as for technology costs, I think we're missing the internal piece. You can bring the line to the door, but if people can't get it in the door, that's where we need some funding as well. And lack of standards, again the American Telemedicine Association has been instrumental in getting standards developed and published, and people are waiting for standards, docs are waiting for standards, the payer is waiting for the standards, and standards are going to be critical in moving telehealth forward. So I think that people really need to think about the money they get from grants and others as venture capital and have a good business plan in place to move this forward. And like I said, patients want this. You will have no problem with patients whatsoever. Unfortunately for reimbursement, Medicare has been allowed to develop a regulatory process that promotes inequity and keeps beneficiaries from getting care they need, and there is no other simple way to put that, no nice way to put it. We need to change

that. It is inappropriate for my dad who is 92 years old to pay $90 to be taken from the skilled nursing facility across the street to a physician's office to get a telehealth visit with an infectious disease doc and then pay $90 to be transported back across the street again because Medicare doesn't pay for telehealth in skilled nursing facilities. That's inappropriate and we need to have that changed. With Medicaid, the State of Wisconsin pays for everything because I wrote the law. We just need to go out and starting working with Medicaid agencies and helping telehealth programs create the fiscally meaningful argument, and there's data out there. Again, I don't mean to beleaguer, but the American Telemedicine Association has an initiative to help programs understand how to move forward with reimbursement.

The other big issue is chronic-care management. CMS again doesn't pay for chronic care over telehealth for two of its neediest populations, people in skilled nursing facilities.

We have a physician group demonstration project at Marshfield Clinic. We must have saved CMS last year. We get paid back part of that money we save them, so they already have a model in place for everything we've talked about here in terms of reimbursement. What they're concerned about is fraud and abuse, and again, that to me is a no-brainer because they've been paying for teleradiology for about 40 years now, and if you could have fraud and abuse, that would be the place, yet we have no experience with that in the teleradiology applications. So what are we waiting for? The bus is not going to come down the road unless we're driving it. I know I'm way over time, but these are the things that I think we need to get done. We need to fix the Medicare reimbursement issues, and that's all the things that we need to do with Medicare and Medicaid. Again, the standards, we need to find some way to fund organizations like the American Telemedicine Association who have clearly shown some leadership in this area to develop those standards on which

Medicare and Medicaid and private payers and credentialing agencies will look.

Then from a broadband perspective, I think there are lots of things we could do. We can certainly increase funding for USAC. We can allow USAC to fund in-house infrastructure. I think that for all of those ineligible practitioners or organizations wipe that out and let people based on need apply for USAC funding. I believe we need to change some of the funding programs like NTIA and TOPS and RUS to be more service oriented. If you require people to provide service whatever it is, the broadband will come with it, so you fund the service and you fund the broadband and that will be sustainable.

We've not quite gotten there. We don't want to crash and burn on the way here. We've got a lot of excellent things in place, we just need to build on that model, but we also need to be really careful that we don't get frozen in place because we could make this really complicated, but in my view it seems to be really easy. We know

where we are and we know where we need to get. Thank you.

DR. KAUSHAL: Thank you very much. Lastly we have Aneesh Chopra who is the current CTO and Associate Director for Technology in the White House Office of Science and Technology Policy.

MR. CHOPRA: I love those graphics. That was fascinating.

My very first experience with telemedicine was a visit to a clinic in Charlottesville. About 5 minutes before my arrival the host of my visit was greeted by a phone call or a telemedicine call by a rural hospital that had a patient not even a week old maybe, and the patient had cardiac conditions that needed immediate evaluation and ultimately needed surgery. In prepping for my visit, the host of that clinic had actually saved that child's life, that of course being Dr. Karen Rheuban who is sitting to my left.

Telemedicine has been a very important

part, but has served in many cases as a secondary component of the health care system. What we are about to discuss today and the reason why this seminar as part of the National Broadband Plan is critical is that we cannot move forward in advancing our nation's health care reform goals without the appropriate use of technology in health care, and telemedicine is a key component. I say that as the President's senior adviser on technology matters. I say it because I've seen it firsthand, and now the question is how do our public policy barriers and opportunities for improvement engage on this important question.

I'm going to spend the primary set of my remarks talking about the opportunity for innovation through telemedicine and I'm going to do so in three pieces. You've heard a lot of these themes and so I'll do my best to share as I look at this from my vantage point serving the President. First, if we are moving toward a health care system that works, one that rewards quality, lowers costs and improves access, it is

impossible to envision a scenario where we don't rethink how our payment structures work or how we create the incentive market conditions if you will to get a higher priority order for technology. Protima shared with you the early work around the President's budgetary impact on the 30-day readmission program. Karen had shared with you data from the VA that telemedicine had been a tool used to reduce readmission rates some 19 percent I think was on your slide. What we're looking at in just our payment reform baby step which is the fiscal 2010 budget request will essentially create the market conditions where it's now in the economic interest of our hospitals to find ways to stay connected. We may do so through formal channels. There may be consults that are done in the home perhaps. There may be something as simple as a two-way pager that's invoked that would require one to provide data on perhaps their health status that could be fed into a database for analytical purposes. But it creates the market conditions that naturally would encourage

and inspire an increase in the adoption rate. By the way, I used to work at the firm of Protima's today and I remember my very first case study back in 1997 celebrating the use of telemedicine as a way to reduce readmission rates. 1997. It's fascinating how we've got the data to prove it today what we'd seen in the market back in 1997.

The second question is that we are clearly in a scenario where we will be establishing a digital foundation. Much of the discussion and the imagery that Nina had shared was about the experience process, $10,000 or $15,000 for the experience kit to communicate back and forth. But my point in this second bullet is that the power of data will allow us to create new capabilities that we may call telemedicine or health IT powered care, we'll have some acronym that people who do this for a living will do a better describing it than I can. My point is we are ever increasing the base of data upon which we can make decisions. Football season just started and I'm a Pittsburgh Steelers fan and so we had a

wonderful week. I'm very pleased. It was very stressful on Thursday. But if you think about it, had the Steelers lost Thursday night, and I was in a despondent mood and I was thinking about what I could do to pick me up or cheer me up, I would guess or bet that the good people at Best Buy and others would figure out exactly the right promotion to run based on their transaction data to maximize my ability to buy a plasma TV so that when they play the following week I might have a more richer experience. I say that with celebration for a retailing sector who has figured out how to take advantage of data to make better judgments, but then to invoke the challenges we face in health care.

I spend a great deal of time in the R&D world, cancer care being among the most important in my mind for us to get right. Despite the fact that we spend record billions in research, less than 3-1/2 percent of the nation's cancer patients have data captured in any meaningful repository because they're a part of a clinical trial that

requires such data to be shared. There is no Best Buy television promotion analogy in the cancer care community today because that data is now stored in an environment that would allow us to make meaningful judgments.

When you start to find buckets of data collected in areas, there will be policy issues around privacy, security and use cases, we're going to have a lot of debate about that, but when you think about the broader question of what would happen if you could supplement that data, maybe the physician's notes or research results, with patient experience and could aggregate patient-sponsored data alongside these other components to make a complete ecosystem to make sure that my treatment plan makes the most sense for me? There will be new opportunities for telemedicine to complete that loop. And today, because I'm worried about my health, every time I go get a Starbucks latte I go into nutrition programs on the apps store and I enter in the fact that I had my grande vanilla nonfat latte, I do

that because it tells me how much sugar intake I've got today and I'm a little bit more mindful of that that when I eat other things in the day. This isn't telehealth. What is this? It's an opportunity for innovation, and we're seeing more and more of this in that data-driven health care system we want to have.

Which leads to my final premise around the opportunity to drive innovation, and that is as follows. We are increasingly living in a digital world where new platforms are being created that have the effect of democratizing access to some of these capabilities. You may have already said it, I missed your remarks earlier, but I believe we will reach a tipping point in our definition of telemedicine when we move away from the enterprise-to-enterprise contract negotiations that seem to be at the heart of these plagued challenges and move more to the individual's role as the organizer of their care. When we have standards where thousands of new devices can plug into their cable set top box or

their other in-home networking device, we will see wonderful opportunities for entrepreneurs to build applications that will be relevant for me. Part of what I do for the President is to help understand what will the world look like when we wire up the nation's energy grid, wire up the nation's schools and wire up the nation's health care institutions. You can't answer the question of what the world will look like unless you have platforms upon which more innovation can take place and we move from the enterprise level activity to one where we've democratized access to these capabilities. There will be a hunger for some of these new tools and services that will be made available at price points that will be extraordinarily affordable, and I look forward to celebrating what I can do to remove policy barriers and to encourage the adoption of these things. We have begun conversations at the FDA on how their governance around medical devices affects some of these issues, we've begun the issues of our payment system around these

questions, we've around how our investments both in broadband through the President's BTOP program and the RUS funding components in the stimulus package, plus the health care IT investments, plus all the myriad investments that we're making as part of our ongoing operations within NIH infrastructure, within HERSA, and within all of the other agencies, Indian Health Services, VA, DOD and so forth. We are going to do our best to engage on these issues and look forward to working with you.

I'll end with one final broad notion because Karen presented the data or the picture of the RAM clinic just to reinforce the notion. This debate around telemedicine and the importance of health care is about invoking a new spirit of community, what we refer to in Virginia as the spirit of commonwealth and what the President keeps talking about which is reengaging the American people in our democracy. This notion that we're going to make these big changes at agencies, they can and should happen, but they

will take time. But in the here and the now in the next 30 days, 60 days, 90 days, 120 days, in the spirit of commonwealth we will be making judgments that will help to move this ball forward whether it be in data standards, today we announced that I'll be chairing an implementation effort on data standards so we can move that ball forward faster and get the feedback on the ground, whether it be in our stimulus investments in the near future, whether it be in engaging the private sector to do what it's been doing naturally and to invoke more entrepreneurial activity in this space. The spirit of commonwealth will allow us to bring some of these new applications forward while we wait to work on some of the larger policy challenges are before us. That's our mission, and it's been a pleasure to be here today and I look forward to your questions.

DR. KAUSHAL: Thank you very much. The first question is I think the panel has outlined the current capabilities of telehealth, and Aneesh just went into some of the future considerations

that they're looking at. I'm going to ask the same hard question I asked the first panel, What do you think will be the connectivity requirements to really empower what we have today, but more importantly, all the things that Aneesh has discussed that are coming down the line?

MR. CHOPRA: I'll make one observation and let you all go quickly. For those of you who haven't read the meaningful use proposed definitions, that is, the federal advisory committee that advises Secretary Sebelius through Dr. David Blumenthal in the health care IT space has identified a set of clinical outcomes goals that heretofore my dear friend Farzad Mostashari keeps referring this to the challenges of switching from a world of nouns to a world of verbs, much of what we saw today and we've been talking about has been the world of nouns, what equipment do we buy for specific things that have to be reimbursable and so forth? The verbs are to what end, and you heard a great deal of that from Karen's remarks about some of the use cases. The

federal advisory committee that recommends on what the meaningful use definitions should be gives you a wonderful window. So the question to this group is, How can telemedicine provide the most-effective business case to advance those outcome goals that are required for those who are engaged in the definition of meaningful use for reimbursement? That interesting twist, if that loop is closed, will be a big opportunity for this industry.

DR. KAUSHAL: Please go ahead.

DR. SAFAVI: I think that for telehealth to be transformative, to have a material impact on the relationship between access and quality, you're going to have to have the level of connectivity that we are seeing in the most advanced forms now, and it's going to have to be managed so that one can dependably perform a medical exam at that sort of a distance. People will dabble with telemedicine at lower bandwidths and less reliability. But you don't really introduce a transformative impact until you have

the ability for face-to-face care to compete with care at a distance, and for it to do that you're going to have to have this kind of experience. So our current examples, 10 megabits both directions and stably managed, now it also has to also reach to places that patients typically are and not just institutions, in the community where the doctors are and where the care is provided and potentially all the way to the home. I think until you get to that stage it's going to be a novelty. It's going to be useful from a social justice perspective in terms of meeting the needs of people who have no access to care, but it's not going to have the economic in terms of changing the relationship between supply and demand and affecting competition.

MR. GARR: I'd love to hear from some others on that particularly Nina who seems to be doing quite a bit of telehealth with a dialup on steroids, so if you could tell us a little bit about what you think the bandwidth requirements are here.

MR. CHOPRA: That 300K thing threw me for a loop.

DR. ANTONIOTTI: This question always comes up and I think that we probably should either shoot ourselves in the foot or stop trying to answer it because every time we answer it it's going to be tomorrow it will be different. We do telepathology on an Internet connection. If that's the only service you're using then you just need an Internet connection and an Internet browser. If you want to have a primary care clinic with a doc's PACS, teleradiology, a fully engaged electronic medical record where the doc is interacting with that EMR and the staff maybe 10 times for every patient like we have, then you're going to need more bandwidth. Our minimum for our primary care clinics is a 10 meg line. In many of those we have two 10 meg lines. At our one tertiary care site we have, I can't even tell you, probably 27 100 meg lines. What I believe is the need is to have something that's easily scalable so that if I put in a 10 meg line and I start to

bump the ceiling of that that my telecommunications carrier can see that and just bump me up to 20. Then if I maintain that for a month or two, then he sends me a letter and says, Nina, you've got to pay for 20 now, and it's not 2 times 10, the cost of that is also scalable.

Our interactive clinical visits are at 384 kilobits and you can do everything that you need to and maintain the level of clinical quality that we require, and it's pretty darn high. I have really high standards. We love to run it at 512 and when we go outside of our system we run it at 768. I have lots of vendors who tell me you got to have 1.5. No, I don't. At home, and I live in a very rural area, all my neighbors are dairy farmers, I have 768 kilobits over wireless Internet for $400 a year. If we need to get into the homes, that's how we're going to get into the homes at $400 a year for 768 which is more than I run on my telehealth visits on my own network which is hundreds and hundreds and hundreds of gigs.

I think the issue for me is that it needs to be something that's easily scalable, that's priced economically so that if I double that over the course of a short period of time that I'm not paying double, and that we really, really look at not creating some standard that says you have to have minimum bandwidth or you have to have minimum X, because the minute we do that we're going to weed out hundreds of providers and people are going to go without care. What we should be doing is saying we need systems in place that are scalable, that can increase bandwidth and increase speed on demand, and that when people are thinking about multiple applications, they need to think about the bandwidth that fits all of the applications. It's like do you want a Cadillac? Do you need a car? Do you get the Cadillac or do you get the Neon? If you've got to take the President's chief IT person to lunch, I'd rather have the Cadillac. Again, you think about what your needs are and go that way.

MR. CHOPRA: Let's take a bicycle and

save greenhouse gases.

DR. ANTONIOTTI: How about my motorcycle? So I think it's scalable, it should be an on-demand capacity, and then priced in a way that again it's economical. I just don't think we can answer the question of how much and what's the minimum.

DR. RHEUBAN: I agree with Nina in terms of scalability. We do our telehealth consults on slightly higher bandwidth, 768 at a minimum, but it's very effective and it works. The better the image resolution -- HD is even better in terms of adoption. To Nina's point that necessity is the mother of invention, if you don't have anything, even a choppy connection is better than nothing. And I would also say we should also challenge the industry to get better video compression standards and to do things that will help us make use of what we have and what we deploy. I think we have lots of opportunity. I agree 100 percent with Nina that it doesn't have to be the Cadillac, but I think we certainly need to do more.

DR. SAFAVI: I think that the points are very good, but they're also very telling in that if you ask the question, do a thought experiment, let's say we fix the reimbursement system, let's say we fix the regulatory system, what we took was a given where we are at in terms of bandwidth. I don't think you're going to see wide enough scale of adoption to create the kind of competitive situation that's going to have a measurable impact on cost and access until you start to get to the level of fidelity that people are used to in the rest of their lives. That kind of bandwidth doesn't work in my house with teenagers at this point, so it raises an interesting question which is absent any option, it's better than nothing, but I'm not sure that you're going to get the kind of adoption you need unless you address that issue. So I think everybody is right, but the question is what do we really want to accomplish and at what scale.

MR. GARR: That's a good point. No one should have the impression that we're content with

the current situation, so I think all the comments make sense. But it is interesting that you can do a lot, and I think that necessity is the mother of invention is great, but none of us should view that that's acceptable for sure.

MR. CHOPRA: I'd like to twist the question a little bit. It's very interesting to hear telemedicine because my impression of the field is every time I engage on the telemedicine front it seems like we've figured out how to do 10 more things. Is there a limit here? If you could answer it in this way, which is to say what's the potential value of telemedicine to patients? Is this something where we can get to a third of the activities that the system does on a regular basis and can be pushed to telemedicine? Is it 10 percent? Is it 80 percent? What's the limit? And then what's the ultimate benefit to the country when you start thinking about if we did have all this nifty stuff and you were able to do what you needed to do, what's the potential benefit? If anyone is willing to quote a number,

I'd love it. I totally understand that it's a slightly unreasonable question but I think it's a good one to discuss.

DR. ANTONIOTTI: We have for a number of years looked at telehealth and created the discussion and the arguments that whenever you have telehealth in place you contribute economically to the stabilization of a community. In fact, recently I saw some economic forecasting tools that showed the economic value to a community of having a volunteer in your telehealth program, how many dollars that actually adds to the community where that volunteer lives. To me the potential value to patients, and we have lots of statistics, if you have telehealth in your ER and that ER is linked to a series of specialists in a more comprehensive emergency department, you can avert 80 percent of your transfers. If you turn that into economic dollars for families, for patients, for payers, for employers, if you have telehealth available in a workplace you can reduce lost days of work by 65 percent; there are lots of

these studies out there.

I look at if I can reduce all the outreach that the docs do at Marshfield Clinic by 80 percent and reduce patient by 80 percent, I think that's where I can get to easily right now. If I have connectivity into the home, if every patient has a telephone and every patient has Internet so that they can download data and I can have a video consultation with them at 30 frames per second, I think that many of our clinics would almost cease to be, you'd just have to come in and get your blood drawn if we could figure out how to do that at home. So I think that we would see a major shift in how people receive their health care. And we see it now. If you're building a remote monitoring technology and it's not in a cell phone, forget it because people don't want to stay home and wait for the dang machine to do the work, they want to be on the go and working with the mobile device. So we already see a shift and health care really needs to be convenient for patient, and telehealth does that.

MR. CHOPRA: I think if the question is asked in what category of health services might we see the greatest leverage from telemedicine, I would argue that the prevention and wellness space has by far the greatest opportunity. In a classic two-by-two matrix of opportunity to be a lead candidate for the source of impact and an area that has yet to be delivering the value we expect of it, I think that the prevention and wellness space has had very little system innovation and that when we do get to solving the problem, it will largely be driven by technology solutions mostly powered by a remote monitoring capability. That's my hypothesis.

MS. ADVANI: I would add to say that with all the focus on telemedicine, anything you read is about managing of care of people who have already been in the hospital, so it's post-discharge management of care or actually treating of patients in remote locations, so it's always about somebody who is already suffering in some way, but really the true potential of

telemedicine is preventing care, that you would never see these people because they can call in some basic vitals that would keep you tracking and you would never need to see them. There was an interesting study I read just before coming here in Oregon where there was a bunch of seniors who have allowed this, it's commendable, who have actually built sensors into their houses and the grant money is letting them track the cognitive skills of these seniors on an ongoing basis. I know it sounds Big Brotherish, but at the end of the day, these are seniors who don't want to move to a home, they want to live in their own homes, and the tradeoff is let us monitor you so that if something happens, someone can come in, but otherwise you are free to live as you would in your own house. Can you imagine not moving them to a home and not needing that day-to-day care by somebody watching over them, the cost avoided from that, purely preventative. These seniors have no reason other than age to be moved out of their homes. So again, prevention is probably the

biggest.

DR. RHEUBAN: I agree with everything that's been said. I think what we need to do is ask CBO to dream large with us because prevention doesn't factor into their analyses, and that's a very important element. We've seen a 40 percent increase in our volumes in the last year. We don't know what's going to happen when it is ubiquitous because there will be a tremendous demand for services. We ourselves have workforce capacity limitations in terms of what we can do, and not to mention the entire profession. So we need to think large and increase training of health professionals well including in terms of these technologies.

DR. SAFAVI: May I take that one step further? I agree with everything that everyone has said here, but I want to make a point. Aneesh made a really interesting point which is doing things that we haven't thought of yet, and typically with technology the first order of return is replace, then do more, and then finally

do things you haven't thought of. Two examples of things that might make a big difference where patients benefit, today if you're going to see two doctors, you have to them in a row. You go to the primary care doctor and then go to the specialist doctor. There is no reason why that has to be with technology. Imagine if you could go to one doctor and then bring the other ones in at the same time. They'd have to rework it. It's possible.

Second, our experience is that patients view technologically augmented care as better than face-to-face care because they participate in a way that they weren't used to. So with an electronic autoscope, the patient sees the same ear drum the doctor sees. That doesn't happen in a regular office visit. They felt more engaged and expressed a preference when they were examined once that way and once in a conventional visit and you could argue that patient preference might say that that kind of care is better than business as usual.

DR. KAUSHAL: Another interesting point.

MR. GARR: Excellent, excellent answers. Thanks very much for that. I'd like to ask a question that came up in the prior panel that I put on hold until Aneesh got here. I think it's a good question and I'd like to spend a minute on it, and then we'll go around to some of the other questions that have been asked from the audience and online.

There were several questions on the panel prior about what efforts are going on in terms of coordination across the federal government on health care particularly as it relates to broadband issues around health care. It didn't seem to make sense to answer the question since I knew you were going to be here soon. I also hope everyone recognizes that the fact that you are here is evidence of this, the fact that this is not your first trip, nor will it be your last trip here, and vice versa. We have all been spreading out all across the Mall working with the different agencies that we need to. But

given the seat that you sit in, if you could offer a few comments on what the coordination effort is across government on these issues, I think that would be helpful.

MR. CHOPRA: Thank you for the question. When the President thought of the notion of assigning a role for a Chief Technology Officer, it wasn't in the traditional sense that I'm running an engineering department and that we're designing new government agency structures, although that may be interesting. I don't know.

The idea was twofold. One, we have a number of national priorities for which technology will be a meaningful part of the solution but perhaps had not been more formally organized. Second, we happen to have a growing technology economy and we are constantly looking for the next killer app that will employ thousands upon thousands of Americans, and hopefully at this time of economic challenge will be a source of growth. This is a twofer. This does require coordination because the word telemedicine itself or health IT

may not appear in 85 federal agency subchapter Z, regulation B, but when you actually figure out what it is they're trying to accomplish, then you understand that bringing them around the table would allow them to think differently about how they can embrace certain components of technology. There are a wide range of comfort levels of technology across the federal agencies, much as you would imagine there are in all aspects of society. We have formal organizing mechanisms. In health IT we are benefited by a National Coordinator, Dr. David Blumenthal, who is first rate and among the nation's best. I serve as his direct liaison in the White House, and so we are working very closely. In fact, just this very day I was on conference calls with the VA and a number of agencies on related issues. So point number one is we get it. I will probably miss a great deal of things as well, but the Office of Management and Budget is doing its best to capture. Not everything that you might think could be telemedicine or health IT powered is

described as such and there may be programs that fall through, but for the most part we're getting great traction.

Second, I would say that we're creating more capacity. I serve as CTO, but part of what the President wants to do is hardwire a culture of accountability across the federal government. We have a Chief Technology Officer newly appointed within HHS, Todd Park, who himself is an entrepreneur who came out of a venture-backed company, Athena Health. Todd is my right-hand man. So while I do my part, Todd is every morning and every night focused on how to organize health IT within HHS, and that job is full- time in and of itself.

More generally I would say we're getting better at this, and I think the opportunity to introduce new innovations to the ecosystem is the second half of the twofer. I am fascinated by all the new products and services that my friend to the left and firms like his are producing, and to the extent that I can knock down barriers, the

three levers that I have to support innovation, one is on standards, and I'm going to be working like a dog on making sure that this standards drive innovation and not stifle it. Two is we have a $150 billion R&D portfolio. I'm going to make sure that we've got the right mix in that portfolio to spur innovation through pushing as much as I can on the applied R&D fund where appropriate. In fact, I'm required by the stimulus package to establish a research-and-development roadmap for health IT. Rest assured that health IT will include telemedicine. Then the third lever would be in the area of procurement. When we buy stuff, increasingly we have new and creative ways to buy stuff that's a little bit more cutting edge, the use of prizes and competitions and challenges. That's why I was able to fund Dr. Rheuban's Infant Mortality Initiative. By the way, because of that program and others, Virginia's infant mortality rate has hit its all-time low. It fell 15 percent I believe in the latest data, and her work will

even further contribute to that number.

So we are going to apply all levers to drive innovation in this space. If I'm missing something, tell me, and we're going to get to work.

MR. GARR: Thanks for that. I'll just add one point to that. The Broadband Team here at the FCC has been very pleased how welcoming all the other agencies has been. Our hope is that that spirit continues, and that when we get to the end of the planning process we have a plan that really does hit all the needs that the government has and that the country has.

With that, we are running short on time. I'm going to turn it over to our Dr. Mo. There's a Dr. Mo over at HHS and we have one here as well. They know each other which is good, so I'll turn it over to Mohit Kaushal to wrap up for today.

DR. KAUSHAL: Unfortunately we've run out of time, but I'd like to thank the second panelists. Again I think everyone would agree this has been a very interesting day. We've only

scratched on some of the topics, but I'm looking forward to delve deeper in the next couple of months. Once again, thank you everyone for taking the time, and thank you everyone for participating here as well.

(Whereupon, the PROCEEDINGS were adjourned.)

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I, Carleton J. Anderson, III do hereby certify that the forgoing electronic file when originally transmitted was reduced to text at my direction; that said transcript is a true record of the proceedings therein referenced; that I am neither counsel for, related to, nor employed by any of the parties to the action in which these proceedings were taken; and, furthermore, that I am neither a relative or employee of any attorney or counsel employed by the parties hereto, nor financially or otherwise interested in the outcome of this action.

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