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WHAT HEALTH CARE INNOVATION MEANS FOR CONSUMERS

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PROCEEDINGS

MR. WEST: Good afternoon. I'm Darrell West, Vice President and Director of Governance Studies here at Brookings and I'd like to welcome you to this form on What Health Care Innovation Means for Consumers.

Health care innovation creates many opportunities for consumers. It puts them in a position where they can control their own health records, rate physicians and hospitals, learn from other patients and focus on positive health outcomes. Digital information makes it possible for patients to engage in their own health care to a degree not really thought to be possible in an earlier era.

But of course there are many obstacles that make it difficult to take full advantage of the innovations that already have taken place. This includes barriers in terms of how we think about health care, the way that medicine is organized, how insurance companies reimburse costs and disincentives based on government policy.

Today we have put together a distinguished panel of experts to discuss health innovation and tell us what new advances mean for patient quality, accessibility and affordability. On my far right is Robert Logan. Rob is a Senior Staff Member at the National Library of Medicine of the National Institutes of Health. Rob is a leading authority on health informatics and health communications. He has written a number of different pieces, but one article in particular that is very relevant for our discussion is one he wrote, "Developing Tools and Strategies for Consumer-Centered Health Communication." He previously served at the University of Missouri-Columbia School of Journalism, and he current directs research for the National Library of Medicine's Office of Communications and Public Liaison. Aurelia right next to me is Senior Vice President and Chief Information Officer at New York Presbyterian Hospital. She has seen all aspects of medicine. She started her career as a registered nurse but now deployed new lab and patient monitoring systems for the hospital. She is on the front lines of medical innovation by showing how information technology can improve health care beyond some of the techniques that we've already seen such as computerized physician order entry and electronic medical record systems. New York Presbyterian aims to improve quality in ways that aren't yet formally measured and she is helping to develop some of the new metrics that take into account what actually happens in hospitals and how we can tie treatment actual health outcomes. To my left is Jamie Heywood. Jamie is a co-founder and chairman of patientslikeme.com. He entered the medical field in 1998 when his brother Steven was diagnosed with ALS. He and his leadership team have been innovators in the area of biotechnology, personalized medicine and new forms of patient care. His organization emphasizes patient-centered medical information. It helps patients share in-depth information on the symptoms they are experiencing in a variety of chronic conditions, they treatments they are getting and outcomes that each of the patients is noting. This helps clinicians, providers and drug manufacturers to understand the disease from the standpoint of the patient. His work has been profiled on *60 Minutes*, the CBS *Evening News*, NPR, in the *New York Times*, in *Business Week* and *Science* and *Nature*, among elsewhere. His family's experiences have been the subject of Pulitzer Prize winner Jonathan Weiner's biography *His Brother's Keeper*, and in the Sundance Film Festival documentary "So Much So Fast." Our last panelist on my far left is Nate McLemore. Nate is the Director of Business Development and Policy of the Health Solutions Group at Microsoft. Among his responsibilities are working to improve the ability of information systems to communicate with one another, developing web-based medical records and linking health information to patient outcomes. Prior to joining Microsoft, Nate was the Vice President of Business Development for Relay Health Corporation, an online doctor-patient communication provider, and previously he held positions as Director of Business Development for eScript Corporation, and he also was Director of Federal Affairs for CFM, a public affairs firm in the health IT area.

I think we're going to have a conversation in the panel and then we will open the floor to questions and comments from you, but I'd like to start with Rob. You have written extensively on consumer-centered health care. Why don't you start by defining for us what is consumer-centered medicine and what it means for individual patients, and then I know you heard David Blumenthal, the health IT coordinator for Health and Human Services speak this morning, so you might address whatever insights he offered as well.

MR. LOGAN: I think I'll start with what Dr. Blumenthal said. The best definition I've ever seen of consumer health informatics is in a new HRQ report, and I'll give you the cite later, I'll have to dig it out, that is by far the best definition I've ever seen and the most comprehensive and the best thought through. By the way, the same HRQ report reviews 146 research studies that have been done about consumer health informatics all across the country. Essentially our view is that there is evidence of its efficacy across a whole wide range of issues. The way to describe it you is that's the first macro type report that's ever said that there is hard scientific evidence that the intervention and the utilization of consumer health informatics services is clinically efficacious and also helpful to patients. I've never seen it addressed that squarely in my life or that comprehensively. Others on the panel can disagree with me. By the way, there are some recommendations in the report that personally I think are nonsense, but that doesn't matter. I still appreciate what they've done. Now that I've said that, I ought to say that I speak for myself and not for the National Library of Medicine and not for the National Institutions of Health or the federal government. My thanks to the Brookings Institution for the invitation to be here, and also my thanks to Dr. Patty Brennan of the University of Wisconsin who asked me to pitch hit for her today. I appreciate it, Patty.

There is a consumer health informatics summit going on sponsored by six or seven different federal entities that's going on in Potomac as we speak today and tomorrow and a couple other people on the panel were also there earlier today. This is what I got out of the comments this morning. Remember that Dr. Blumenthal is a very careful speaker. He is very careful to define the parameters about of what he talks about in a very narrow fashion. Therefore, whenever he pushes the envelope a little bit I get very interested in what he has to say because normally he doesn't do that.

First of all, he gave a quote right at the beginning that I found to be very interesting. I think I got it word for word, "Health information technology is the most efficient circulatory system for the lifeblood of health care which is information." I can't say it any better than that. Then he talked about two realities that he saw as problematic later on in his discussion. The first is that he believes the pressing need for the evolution and development of consumer health informatics, he believes the most pressing need may be because physicians and patients are increasingly strangers all across the United States much more than in the past. He didn't say this in his talk, but I've heard him talk about it in the past, that it is not unusual at all in major medical centers today that are not HMOs for a person to be admitted to lose contact completely with their primary care provider and that person is sent over to the specialist inside the hospital, they are complete strangers, they've never the person before, and not only that, the specialist doesn't necessarily communicate with the primary health provider. That decision is made institutionally and it's not necessarily made the way it used to be.

Again I'm describing you something that I hope you now that is common practice. It's been common practice for years in HMO institutions but it hasn't been in others. What we're seeing now is an increasing environment where physicians and their patients are strangers and I think that one of the things that Dr. Blumenthal argues is that reality creates a pressing need for everything we're going to talk about today.

The other thing he talked about which is a barrier which I find to be really interesting is essentially the poor adoption of health information technology within the medical profession. These are his figures that he gave today. He didn't use a citation, but I've similar cites in recent articles in "JAMA" and the *New England of Medicine*. About 17 percent of physicians have adopted health information technology for us in clinical care. We're not talking here about billing. Among physicians and other institutions, the figure this morning of the adoption rate is around 10 percent. My personal opinion is that it may be slightly higher than that, but nevertheless, the point he was making was to juxtapose that with the Pew statistics that show that 73 percent of Americans now routinely go to the internet to get health information. I hope I just got through to many of you. There is an obvious chasm there, we're talking about larger than the Grand Canyon, that is emerging.

Here we have consumers driving, getting information as a matter of routine, from sources such as the ones that Microsoft provides or Medline Plus or WebMD or whatever, and we have the physicians and the providers that the same patients use that are not using the same technology. We had a study that we had to do a couple of years ago where the primary condition of the study was that the providers in the study, it was health education intervention using Medline Plus where the providers in the study had had several years of routinely emailing patients. That had to be a routine part of their practice for the study to work. I see people smiling on the panel. You wouldn't believe how hard to look to find a place where that was the condition. It shouldn't have been that difficult, and I think that ought to tell you something.

Because of time I don't go over but we can come back to later big innovations. I think the best innovation that we have right now is something that other members of the panel know a lot about particularly the person on my left, so I'll let them talk about it more, but the thing I'm really excited about is when you take a comprehensive consumer health informatics dataset and you combine it with a patient health record and the result is as you look up information about your particular condition that you can retrieve tailored, specific information from that source about the medications you're taking, about the etiology of your own illness and you can use that to ask and get much more information if you prefer including links to PubMed that tell you the research that's been published. That's something that I'm very excited about and that's an innovation, that is fairly fresh and new, but there are others on the panel who can address that better than I can.

The area in terms of barriers that is not discussed very often and should be, I hear interoperability discussed all the time and it certainly was discussed by Dr. Blumenthal this morning, but when interoperability is addressed it's always addressed in terms of tools and technology. That's important, but there is a key issue which is never discussed in terms of interoperability which is absolutely critical: the medical language you're using. Why is it that we have lots of developments of patient electronic health record systems that don't map to ICB codes, that don't map to

UMLS or the uniform medical language system? Do you realize how difficult it is to take somebody's medical language and to transfer it over? That is an interoperability maybe at 30,000 feet. The process if doing that is enormously laborious. It is not nearly as laborious as it was 10 years ago I'm happy to say, but nevertheless that's a very fundamental issue. If we don't have a consistent medical language consumer and professional that cuts across the board, in case you don't understand what I'm saying, it's almost impossible to develop a search engine that if you type something in will get what you want. Does that make sense to everybody? That mapping across language is the key to a great search engine. That's why Microsoft Bing works so well and some of their competitors. They're very good at this sorts of things. That is a fundamental issue in interoperability that is not discussed very often in settings like this. It certainly hasn't been discussed in policy issues as well. That directly not only affects us but also is an issue that I think should be on the table and should be on the agenda and that is not a complex issue to resolve. All it takes is will to do it.

MR. WEST: Thank you. Aurelia. Rob is extolling your expertise here and you are CIO at New York Presbyterian. Give us the CIO perspective especially from the health care's standpoint in terms of what hospitals are doing to improve quality.

MS. BOYER: First of all, let me thank you for having me here. It's an honor to be down here at Brookings.

Indeed, I'm charged with running information the technology in the hospital and in a pretty large health care at New York Presbyterian. We have over 2,200 beds across five acute care facilities and we have two medicals, so our hospitals merge, but our medical schools do not, and the physicians work for the medical schools and some of them who admit patients to our hospital of course are independent practitioners. So in some ways my institution is a small version of the whole country. In some places the physicians are employed by the hospital and there are tighter linkages, but in a place like ours which represents a lot of institutions, that's not really true.

To Dr. Blumenthal's point, we've spent a lot of money and time automating our hospital and indeed I'm proud say we've be in the 10 percent or the 25 percent who have automated almost every aspect of our clinical operations. Physicians do utilize our systems, they do write their orders in it, they do write in it and the nurses write their notes in it. That provides me with the opportunity to actually do things with electronic data and start moving them.

A little while ago we started talking about data interchange in the industry and interoperability as well as that can be defined, and I would sit at a table in Manhattan with CIOs from what are competing hospitals and people look at each other and say I'm not going to send my data to any of you. Why would I do that? Our business model does not induce us to get on with that business. In addition, the early discussions about patient portals were about tying to the patients to the hospital or to the provider. We want your loyalty. We want you to come back. We want your business. It was more a let me peek into my records that are at your hospital or any aspect of it, but you couldn't do anything with it. But then I would look at the work that patients like me did and you go, wait a minute. Why are we doing this? Why do we come to work every day. I started as a nurse. I worked in an institution about the patients. It really is. Believe it or not. We have a mission around patients. And so we came to say we want to release this data to our patients. This is their data. We're custodians of the data. We are not the owners of the data and my leadership believed that. So we looked at the opportunities that things like Microsoft HealthVault provided us and we said we're going to do this. So we went about the business of something we call MyNYP. I'm also fortunate. Dr. Mehmet Oz works at our institution and so if any of you have seen Dr. Oz, he's soft of famous from "Oprah" mostly, but he's written a series of books and they're always in Costco so I know a lot of people must be buying them that are about you, you the patient. I joined up with Dr. Oz and we created this vehicle that says here's your record. It's not your entire medical record. People always ask me that. It's a summary of your record and is based on a standard that the industry is evolving called the CCR and we know those are the data elements you need to avoid the problems that happen in transitions of care. Where do we have quality issues? If you look at the studies, medication errors and those kinds of things, it's always in these handoffs from our hospital to another hospital or back to the provider or tertiary case place, people come to us from a long ways away and handed off to your description of an academic medical center. Using the patient as that safety net is Dr. Oz's philosophy. I think things like MyNYP and HealthVault that allow the patients to take their data with them were critical. We wanted to do that early. We've done it. It's available to all our patients. We've been rolling it out and their response is tremendous. It's so exciting to see patients actually go out. This is my EKG and it does try to teach them while they get them things with hover-overs and additional information, other types of education that are available on the internet, but we bring it to them. So if you're having valve surgery it's there for you as you go through the process.

So we're really excited about the work. The other really important part about doing it in this way as opposed to the traditional portal is allowing the patients to use whatever tools are out there. The marketplace of tools whether it's something like PatientsLikeMe, in the past patients to enter all their data in order to make something like that work for them. So here you envision the thing where we're going to assist the patients to do those kinds of things and that there would be a marketplace of tools. So rather than NYP trying to build this elaborate patient portal with a zillion tools that cover every condition, you say the American Heart Association has the best tool out there for dealing with your hypertension. Use that tool. I don't have to write that tool. Funding our internal work is a financial strain on our hospital so here is I think an efficient way for us to assist the marketplace in moving this along.

That's our big consumer piece. Certainly I can speak a lot to automating hospitals, a little bit about other things we're doing quality, because once you have this data what I fundamentally have done is you automate the data. You have to bring the data together. It's across hundreds and hundreds of systems. It's not one big clinical information system in an organization like ours. Use that data for both quality purposes internally, efficiency purposes internally as well as assisting our consumers.

MR. WEST: Thank you. Jamie, PatientsLikeMe. It's a new model for patient collaboration in health care. Explain how it works.

MR. HEYWOOD: Actually I think I want to reflect for a second because one of the things that I'm always fascinated by in health care are amazing stories of people doing things that are for the patient despite the fact that we pay them not to. I love the platform you're building and I love the effort and the incentives, but I remember the data from Partners Health Care when they turned on the ability to share labs across the hospital, lab orders dropped by 30 percent, and if you make money on lab orders, are you likely to turn on an MRI sharing platform to drop your MRI revenue 30 percent? Unlikely. So I think one of the things that I think people don't get is that we all fundamentally fighting an economic infrastructure and I think of it in the following way. I have chosen to define caring because I think health care is about caring. I have chosen to define caring as measuring an outcome, that if you care about something you measure it. That's a very standard business definition. If you care about profits you measure them, if you care about the quality of your cars you measure them, if you care about the quality of your hamburgers you measure them or your customer service. By that definition of caring, investment in measuring the meaningful outcomes of what your business produces, I find it interesting that the only one in health care that really cares in any significant way is the pharmaceutical industry. They're the only ones that invest any significant portion of their revenue in measuring the outcomes of what they do and with the people they modify their outcomes. That is accepted by immense individual efforts within the context of hospitals. What I love about this model, I'm predicting that no good deed goes unpunished, so as you open up this amazing system and you transform your hospital into being more and more effective and you come to standards or care that make patients' outcomes better, the consequence will be lawsuits against you for failing to meet the standards that you are already operating above anyone else because you bothered to measure them. I think we seem to really recognize just how broken the economics are and how powerful the incentives that you need to operate against to begin to deliver patient-centered care.

Which goes to what PatientsLikeMe is. My background is drug development and discovery when my brother had ALS. I ran an institute for 10 years. My brother Ben as the CEO used to work for a company that developed and manufactured coils to treat aneurisms or CTOs and was an author on a biostatistics paper in -- studies and our head of development is a former pharma person. People think we are sort of this group of engineers coming in to do health care, but we're not, we're really interested in discovering what works in the treatment of disease.

What does that mean? What we have chosen to do is to pick a group of diseases where we don't have to engage the medical systems, where we can get the patients to tell us their health status in an entirely patient-centered health framework. This is the really important transition. We decided to do this using a new social contract which is that all of the data on our system is fully open and transparent. So that if you are an MS patient in our system, you will tell everyone with MS in the world how sexually dysfunctional you were in the last week and there are

15,000 people doing that now with MS. I can drill and I can see that 2,360 of them who are suffering from severe sexual dysfunction, and if I want to I can email each of them individually and talk to them. The reason this is important and I think this transition cannot be underestimated is that once you build a fully open medical platform, a fully open medical information network that measures and outcome that you can then crowd source the optimization of care paradigms, you can look at in real time interactively what is modifying outcomes in individuals. In fact, some of the tools we're developing now, we're building systems dynamics models of pathology and disease so that we can predict the future state of each individual in our system so that they can have a baseline on which to fight against. So if you have MS and you have a certain level of functional ability in your thinking or your walking or your pain, we will tell you the probability of each of those future states a year from now and give you something to operate against to see if you can do better than that. I think that model, that goal, that objective delivered with patient-centered graphs and understanding is what's an idealized version of what health care could be if we could overcome the fact that the system has incredible sets of rules that prevent it from participating in that process in some effective way and I think it's worth talking about some of those today.

One of the things that I find interesting about our company and it's worth looking at, the front page of the website you can see some of the information on it, is I don't know why we exist. I'm trying to imagine us existing in another industry that paid for value in any way. You just wouldn't. It's absurd that there would be this company that went out and built a new information platform that was entirely voluntary and entirely inefficient that invented outcome measures that were relevant to human beings because it mattered to the consumer. I think it's worth pointing out that I think the invention that we came up with is that we found a way to make money measuring health outcomes. I'll repeat that. We take all of this data from all of these patients and we go back to the only one that we've identified that invests in caring of patients which is the pharmaceutical industry, and we've modified their outcomes. If you have a good drug, you hire us to understand how it's better. If you have a competitor with a bad drug, you hire us to show that the competitor's drug is not as well. It's sad that it's that invention that came from not something who was involved in the health care system that allowed us to begin to measure health care and we had to start in areas that operate outside of the health care system because the data on which to make good decisions is unavailable in oncology our in cardiology or in areas where we could also make a real difference if we could get access to it.

MR. WEST: Thank you. Nate. One of the big problems in health care has been mentioned already, interoperability, and Aurelia was talking about this so-called handoff problem, the fact that different parts of the system have difficulty communicating with other parts and aren't able to talk very effectively with one another. How can we improve communications across different parts of the medical system?

MR. MCLEMORE: It's funny you bring that up. I flew in this morning from Seattle and it was an overnight flight. I was late to the airport as I often am and so was not able to put bag in the overhead bin and ended up at baggage claim at about Dulles at about 5:30 this morning. I was standing there with about 100 kind of weary travelers watching the spinning turnstile waiting for our bags to come out. I was reminded of a recent study by ITI which looked at the adult patient population and in that population, 44 percent of the population said that within the last year they had a need to move data between two doctors or between a hospital and a doctor, and of that 44 percent, nearly half said the data didn't get there. So I was looking at all these weary travelers saying that's about half these bags not showing up. Maybe some of the bags come tomorrow, some of the bags come with half the clothes, and some of the bags never come at all. The consequence of that for me would have been sitting up here in a T-shirt and some sweat pants and maybe spending some extra money at CVS and we don't tolerate that in the airline industry, yet if we think about the consequence for health in our individual health both in terms of the quality of care we get as patients and the cost of the system, Jamie talked about repeat tests and that type of thing, it's simply intolerable.

What can you do about it? There are a number of things happening. We applaud what Congress and the administration are doing around high tech in terms of not just rewarding providers, physicians and hospitals for adopting IT, but actually using it meaningfully and one of the tests of that is not just the exchange of data, but it's outcomes driven and that begins to I think address some of the things that Jamie talks about in that people don't really have an incentive to move the data. It's not that they can't and it's not that the standards don't exist, it's that the business models don't exist. So in some ways the high-tech act is putting a little bit the cart before the horse and it will help stimulate some of the right things to do, but absent real payment reform it will be challenging to do that.

At Microsoft we invested in a consumer controlled health platform called HealthVault which allows individuals to collect their individual health information, store it in the cloud, and more importantly, be able to share it with different parts of their health care lives. All of us as consumers have data scattered all over. Some may be at the pharmacy, some may be at our health plan, some may be at a doctor, and because of that sort of fragmentation of your health care picture, it's very hard to feel empowered. Once to begin to pull that together, you get to have a more empowered picture of yourself as a patient, and then what we've done is created a platform that devices can plug and applications can plug in so applications like the NYP portal and a number of consumer applications from organizations like the American Heart Association and the American Cancer Society, Planned Parenthood, that may help you meet the needs of your individual health, but then you not only have the ability to help move the data and solve that continuity of care problem, but also to begin to be more engaged and empowered. So the two things if we're really to address both the cost and quality issue for consumers, I think, one, it's about having better data transport and data reuse, of getting the data moving, but secondly, patients need to change their behavior. So it's up to us as an IT industry to create the types of platforms that drive a lot of innovation in terms of ways in which we can do that. But if you don't have a complete picture of yourself, it's very hard to be empowered so we think the two go hand in hand. Of course, thinking about it from a payment system and the economics around that is super critical.

I would say that while I agree with what Jamie said about the economics, there are some positive economics for doing the right things for patients, and a couple of examples that come to mind are hospitals that are using the technology to help patients get a copy of their data. That drives patient satisfaction. It also helps with the referring provider because they can get a more complete picture of what happened in the hospital, and patient satisfaction and keeping a strong referral network certainly helps the economics of the hospital.

The other example that comes to mind is that the Cleveland Clinic is doing a pilot with HealthVault and what they've done is discharged hypertensive patients with a set of devices and some tools that they can go online and use those devices and then report that back to the Clinic. The "Cleveland Plain Dealer" did an article about a truck driver who was driving all day and at night would pull into the truck stop, take the reading off his blood pressure cuff and send it back to the clinic. What was happening is the medication that he was discharged with did not help him regulate his blood pressure in the right way, so by communicating electronically with his physician at the clinic, he was able to dial that back and get him the right medication treatment protocol. Certainly hospitals have economics around avoiding readmissions of patients, and so those are some examples of the types of economics that are useful that help people do the right thing. Certainly there is more than can be done and should be done in that regard.

MR. WEST: Jamie, do you have a reaction to that?

MR. HEYWOOD: I was going to say hospitals have economics about avoiding readmission is that they make money causing readmissions. It's not that they save any money. I'm huge fan of Microsoft HealthVault. I think they're doing an incredible -- I think the service that they provided for free with Google as well to the country for defining data exchange standards is incredibly valuable, but I also think that hospitals make money keeping sick.

MR. MCLEMORE: But there are readmission rules that you're penalized if somebody gets readmitted.

MS. BOYER: Those are just starting to come into play now. They're new now. They're really new. So we're preparing them though, Jamie. We believe that we have a role in that and we're taking those things on as we speak, and having the data, we also use the Microsoft Emelda product to bring all this data together. It's new because we know readmissions are going to change on us and we're trying to be ahead of the curve. The hospitalists who are the people who in my institution who take care of you when your physician who you have your relationship with you don't see anymore, so you're turned over completely to a different set of physicians, that they can look at this tool now and they can find the causes of those readmissions, that they can understand the patterns of things that are going on in our institution and make a difference because even though the incentives are bad, they don't want to cause the readmission. You're right, as a business we're rewarded for that, but let me assure you that's not what people who care for patients are out there trying to do. We are perversely incented to do the more expensive procedure, we understand that, but you don't see hospitals not developing stents and noninvasive procedures and all those kinds of things we do at our institution even though we're going to get economically hit for it. So how we balance that and stay viable, that's a challenge that my CEO has to face.

MR. HEYWOOD: I think the interesting issue here that I struggle with is that the evidence is again all incentives, doctors and health care professionals are incredibly good human beings because they are essentially paid to make people sick and they don't and they generally do much better than that. But I also think that it's interesting that Mayo, one of the examples we cite, from a business standpoint if you measure their captured Medicare dollars sucks. They're just not very efficient. They don't get paid very well for what they could get paid relative to the other institutions that do far worse care.

What's interesting is that we have this problem of talking about a future state and I think we should focus on the consumer here because -- but I think sometimes we fail to acknowledge just now anti-consumer the economic architecture which we operate on so I think we are headed to much better states and I completely agree with you that any business or hospital that is not collecting the information such that when David's new rules which I hope come into effect really soon make it so that you actually get paid for making people healthy, don't get caught off guard. I think we need to understand just how far from a consumer-focused health care system we are and I don't think we lay that baseline well enough.

MR. LOGAN: Let's get back and add a note of perspective. I hope it's perspective for all of you. The development of the health care delivery system that is preventive in nature and that encourages the development of health information systems is a priority of this administration but it also was a priority of the last one which often was not discussed widely as it probably should have been. I think that tells us something. The issue is now as so many politicians love to say, the devil is in the details. But nevertheless, the thrust of the direction of national policy seems pretty clear to me. The issue is how are you going to provide incentives to do those things. The incentives for health information systems are being provided by a series of bills that have been passed over a number of years that fund the development of a lot of systems in medical institutions and even among providers who claim they couldn't afford them. Is that comprehensive? Is that going to solve the problem in and of itself? No. But at least there is comprehensive legislation that has addressed those two issues.

As long as I got the floor, I found the definition. Can I just read it? It won't take it long.

MR. WEST: Make it brief.

MR. LOGAN: I hope it's brief. This is the best one of consumer health informatics I've ever seen, We define consumer health informatics applications as any electronic tool, technology or system that is primarily designed to interact with health information users or consumers, anyone who seeks or uses health care information for nonprofessional work, and interacts directly with the consumer who provides health information to the consumer health information system and received personalized health information from the tool, application or system, and one in which the data, information, recommendations or other benefits provided to the consumer may be used with the health care professional but it not dependent on a health care professional. That is light years beyond anything that I've ever seen.

MR. WEST: I want to come back to a point that Nate was raising about the need for payment reform. I'm just curious, when you think about either the actions of insurance companies or what the federal government is now envisioning in terms of health care reform, are they going far enough in terms of making changes to create incentives for consumer involvement with health care?

MS. BOYER: I think the fact that we're challenged on quality for the first time is a good thing for all of us. I'm a consumer of health care too so I can view this very much as a consumer and I often look at the work we do with that in mind whether it's my mother who's approaching 90 or whether it's my husband who has some chronic illnesses and how does he deal with the health system, and I'm an insider and it's not easy. I'm going to say that out. We have been I think reluctant to release or quality data or to even try to measure our quality and it's too complex and tort reform is not part of the agenda at this point and so certainly I think that should be part of the agenda to really get at these issues including quality, so I think you do a good thing when you bring that up, Jamie, people are not too interested in talking about that at this point in time.

But we are measuring our quality now and it's a complex measurement. CMS is putting measurements out there so the consumer can now go on the internet and say here are your scores on smoking cessation and how you manage congestive failure and are your mortality rates, and we want to do that and we want to help contribute to how those are defined because what is really scary to us is the wrong measures are going to be out there. So right now if you looked at some of the CMS indicators and you compared them to the mortality rates and where the scores are, some places who are not doing the CMS measures as well are getting mortality scores. So do we really know which one of these things consumers should be looking at? We absolutely don't right now. Again without us internally doing that and getting electronic data and in an extensive way. We need a lot of data to get at these things. I don't think we're going to get there in one leap. We're not going to do this overnight.

It's not going to happen with one health care reform legislation, it's going to take a lot of progress and a lot of work over the years. But I think the consumers need to demand it. We want you to be active in your care. I think that's going to help do that. If the consumers don't want health care reform, it's not going to happen and I think that's been a struggle for a lot of years now. So everybody wanted health care reform before the election, when they start hearing the specifics of health care reform everybody's not quite so sure if they really want health care reform because it might impact them and their relationship with their doctor and so that's not working very well for us. It hasn't worked. So I think getting at quality is the only way we're ever going to get at that.

MR. WEST: Jamie?

MR. HEYWOOD: One of the big problems we have in talking about health care is that it's not one thing, and not only is it not one thing. I almost view this as a grid. If you have appendicitis, you have a fairly optimizable diagnostic solution, measurable outcome solution space. You can bracket it out, you can measure it, it's fairly straightforward, you can do it and we could delivery better value in that context. If you have chronic depression, that is a much different problem than a patient who's suffering from congestive heart failure, than someone who is coming in at the end of their life and wants to die with dignity, than a child who is suffering with a severe bronchitis. These are all very different problems.

When you look at this whole grid, I always vision a grid of 100 case samples, and then you overlay the other components of that which is that we really have three -- I break them into three classes of health care consumers in this country, the at-risk population that quite frankly have demonstrated their inability to care for themselves. You could think of them as the homeless or borderline -- the public health crisis we face which draw inordinately on the hospital infrastructures of cities. Then you have the rational consumer which is just your everyday human being who is not an expert who goes in and can make rational choices like they can about cars and everything else. Then you have these experts who are people who become advocates and real innovators in their disease. If you take these three types of people with the grid of 100 problems and you look at the hospital as a monolithic architecture for addressing them and you think about trying to measure outcomes in that space, it just becomes a rapidly impossible problem and I think it does come back to the devil is in the details.

But this where I do think consumers can really add a lot. Where I worry a lot about health reform and the way it's thought about a little bit monolithically is that we are failing to really address the public health issue which is a huge cost drain and awful. We are failing to provide effective incentives to rational consumers to make them part of the good decision process. And we are at some level taking away the innovator's ability to manipulate the system to produce outcomes that drive the innovation. So we are at some level degrading our ability to address -- we're not degrading the public health one, that just sucks, period, but we're degrading our ability in the other two areas to make the system better. I think we are being dishonest. We're having an intellectually dishonest conversation about these different needs. We have to address public health. It is cheaper for me to keep someone who is at risk healthier than it is to not. I don't care about their health. It's just cheaper. And we have to place rational consumer incentives in the cost architecture for the rational consumers. But we also in America should really should be cautious about losing this innovation space, losing the power of the collaboration between innovators and the academic institutions. I think with companies like ours it would be nice to find a way to have the innovators who are beginning to build these knowledge frameworks that are specialized, and I build specialized outcome frameworks, to send that back into the system in an effective way. I think what's sad is I can't think of any economic architecture in health care where anyone -- if I could raise my hand and say I could tomorrow deploy a -- framework for multiple sclerosis that would lower the cost of managing this disease by 10 percent a year for the next 20 years on an annual basis, improve outcomes across the board, lower the cost of developing drugs and drive incentives across the entire system, no one will pay me.

Not a prayer, not a hope, not a hope in the world. Maybe the pharmaceutical industry because they want the drugs, and that's what we do. So I think that problem whether it be me or the Microsoft platform that they're empowering by letting -- the fact that there is no incentive for the entrepreneurs or for the innovators to bring this system back in is where consumers are failing to allow us to drive that. And it's not just consumers making rational choices. It's consumers defining the value of the system on which it should be judged. And I think that's where the consumer empowerment is and one that I think also requires stepping back from control standpoint of the medical information system because at the end of the way it really matters what me as an MS patient or me as an ALS patient or me as a depression patient want as an objective rather than what someone else as a proxy for me wants.

MR. WEST: Nate, what do you view as obstacles to consumer engagement now and how should we overcome that?

MR. MCLEMORE: I think part of it is you don't have a complete picture of your information so the data is moving. One of my colleagues likes to describe when people ask should you have your data online or is it safe to have your data electronically, the fact is all of our data exists in electronic format and it is online and it moving, you're just participating in it and you don't have a picture of it. He describes it as you're sitting at the kids' table in terms of your data.

So I think the first thing that we believe is that you get consumers to be able to have a copy of that whether it's downloading the discharge summary from their hospital, getting in synch with their doctor's EMR, getting a download from their health plan where health plans like Aetna for example are interfacing the HealthVault, so being able to first aggregate that, and then HealthValut is an open platform that then they can take that data and go find applications that might be helpful to them. I mentioned people like Planned Parenthood or the American Cancer Society and others are building those applications and it's still early and it's this two-step process where you need consumers to have data, but we very much believe in an open platform where there will be a lot tail of innovation where people like Jamie's company and others will create very useful ways in which people can get insight from their data.

There's a company called TrialX that has an application on HealthVault that allows individuals to take their personal health record, share it with that application to find a clinical trial that would be right for them, and the richness of the data that they can collect and do that, Navigenics is another company that does genetic testing and people can get a genetic test, store their strip online in HealthVault and get advice about what to do. So it's about getting the data but then creating an environment both with economics but also with an open set of programming interfaces for a long tail of people to intersect with that data in a way that will create the kind of engaging innovation that hopefully will get consumers there.

MR. WEST: Did you have a comment?

MS. BOYER: I think one of the problems we have is most of the consumers aren't motivated and so you find the people who are ill are motivated to use their data and collect their data and I think research and things like PatientsLikeMe show that. In fact, they're less worried about privacy as you've very well demonstrated. Where the people who are well aren't all that interested. In fact, I think most people abdicate completely to the physician and say why didn't you call me and tell me what my result was, rather than I'm going to actively participate in monitoring my own results. So I don't think for the most part people are motivated to do that. To your point, Jamie, I think you bring up the right thing. Where are the incentives to stay healthy? America is not at the right weight to be healthy and these tools and their interventions and their relationship with our providers could be an active part of that through things like HealthVault and monitoring yourself at home and bringing these things together so that you stay healthy and you stay out of the hospital and your congestive heart failure is in control or you ever get there. I don't think there are any incentives for that and I think people are uncomfortable talking about it because we don't want to tell people how they should live their lives. So I think we've got a long way to go on actually getting the consumers that are healthy engaged in the process.

MR. WEST: You don't want to tell people they're fat.

MS. BOYER: Some people don't want to, but other people do tell them, but I don't think as a country we're too comfortable with that.

MR. HEYWOOD: Some of this goes back to what you talked about on ontology and language earlier. I want to disagree with you because I think if you look at the history of standards and information and language, we've coded all of our data back to Medra and ICD9 and ICD10 and those tools relate to the problem you're trying to solve and when you talk about people are not engaged, it's boring. It's medical. It's not engageable. If I get an image or a cholesterol level it doesn't say anything useful to me -- Alpha I type in my cholesterol in there and it tells me more useful information than the doctor ever does. So I do think we have a design problem and I think this is where Microsoft has the right long-term vision here which is that if you could give me a nice little graphic that said what vaccines I'm supposed to have throughout my life and how well I did and it showed up in my standard operating information environment, I'd probably go and get my tetanus shot. As it is, I don't really want to see my doctor because the statistics show I'm actually going to be less healthy if I do. I think that there is this sort of cut for the horse argument or this check and egg argument. Kaiser is snowing 50 percent adoption on their portal. It's wonderful.

MR. MCLEMORE: I think the key learning from that is that what they're able to is offer convenience on transactions and the number one thing people are doing in their Kaiser portal is getting their lab results so I think we can learn a lot from online banking. There was a certain segment of the population that liked to see their checkbook balanced by going to Quicken and taking care of that, but it wasn't until the banks got online and you could have the convenience of actually doing bill pay that you saw a much bigger adoption. So you will get some people who just want to see their data, but when you can do transactions like getting your lab results or scheduling appointment so you don't have to touch the clipboard when you go in.

MR. HEYWOOD: Or email your doctor.

MR. MCLEMORE: Or email your doctor. Those types of features, by doing that you begin to build up data just as by paying your bills online you begin to build up data on your online banking account and that's what will drive I think the 50 adoption that Kaiser and others have seen where they are able to deliver transactions like labs and emailing your doctor.

MR. HEYWOOD: There are two numbers that I think are really important. If you could take 5 to 10 percent of people who are asking good questions and measuring data, it would change the entire system. It's shown over and over again. You only need to have a very small portion of intelligent people armed with data to change the behavior of the entire economic network. And if you have 50 percent adoption of any information exchange, even the people who aren't using it get better care. You know that. It will drive your physicians to be better and you're already getting that. Soon as you ask them a question they start changing behavior. Right?

MR. WEST: Why don't we open the floor to questions and comments? There is a microphone coming here. There's a question right here. If you could identify your name and if you're with an organization.

MR. ALVAREZ: My name is Carlos Alvarez. My question is we talk a lot about technology and the use of these innovative technologies in health care. My question is, could this actually make the system to an extent? In the countries that are mentioned in Mr. West's paper don't have any of these innovative tools and their outcomes are better and they're doing it at a lower cost. Perhaps sometimes we tend to rely too much on technology to remediate some of our problems and we don't have any data to support the idea that better outcomes are guaranteed through the use of these techniques. Should we perhaps start from a more fundamental saying what's wrong with the system, and then once we fix the system, how do make that new, improved system more efficient through technology or could we perhaps be providing crutches to patients and doctors, et cetera, that may actually perpetuate bad practices over the long term?

MR. LOGAN: I think that's a good question and an important one to ask. My actual response to you is look at New Zealand. Look at what's happened in New Zealand in the past 5 years once they had a comprehensive patient health recordkeeping system across the whole country. Look at the reduction in errors in hospitals. The IOM reported several years ago, I think their estimate at that time was 547 Americans died every week because of errors in hospitals, and as Newt Gingrich has often said in public speeches, if two 747s crashed in the United States every week, do you think we're reform the entire aeronautics system? The New Zealand experience is really very I think important. There is clear evidence going back over the last several years of reduction in errors in improvements in a whole variety of conditions, actual improvements in clinical outcomes and many other things. They aren't the most aggressive reporters of what they're discovering, but again to me and many of us, they are an inspiration, they are not unique, but again there are examples of nations. Again their health care delivery system is not the same as ours. They have a National Health Service which we do not have. But nevertheless the data are important.

MS. BOYER: As an implementer of systems, certainly we've all seen the mantra just putting the technology in doesn't make anything better, so you can't just slam the stuff in, and in fact there was so much pushback on the high-tech dollars because a lot of people are saying, no, you're just going to make it worse. You're just going to automate things. You're going to make a big mess. Don't do that. I think that's the wrong attitude. It's an iterative process. But you have to start the process and change the processes and rebuild the system so that technology can do its promise. I don't think it's going to prevent us, but it's not going by itself solve the problem either so that we're going to have to work hard and it's going to be iterative to not do that.

MR. HEYWOOD: I agree with you completely. I think technology -- and I think we have to be careful about what we define technology as. I disagree with the high-tech act. I disagree with forcing adoption of medical records. I think this is really dumb. I think what matters is the questions that you ask the people you pay to do things and I think if you ask the right questions, then they will find the most cost-effective of answering those questions, and we currently don't ask them anything about quality or outcomes in any meaningful way. And if we asked for quality outcomes and meaningful data, they would adopt technology appropriately and efficiently as has every other industry in the world to answer those questions effectively to serve the market. So I think that MRIs and CAT scans are among the lowest return on investment in the history of medicine. Ironically, people always ask us why weren't not on the Microsoft HealthVault network which we will be eventually, and the answer is because we don't believe at the moment that there is any medically useful information in patient health records, and that the questions that we ask patients which are simple questions, how are you feeling, what's going on, determine far more at least in diseases we work with about their health than any other part -- we can work on. So I think it is about the question and not the technology and that is a really important lost concept right now.

MR. MCLEMORE: If I could add, ironically I believe with your premise as well and it may sound strange coming from a technology company, but one of the things we've said is that it should not be about the adoption of technology for technology's sake, it should be about where do you want to do and that's why we're pleased that what the administration has done is try to put -- the regulations are not out yet, but the work of the HIT policy committee to say this is what meaningful use should be about, it should be about outcomes, and let lots of innovation happen to get to those outcomes. Don't lock the world into a 2009 version of what a EHR is and jam that into every hospital and doctor. Put a stake in the ground about where you want to go, raise the bar over time and then have innovation happen to get there. That's why we think payment reform and consumer incentives both will be very important to get all of us in the technology industry to keep innovating and trying to think of a better way to do things.

MR. WEST: Right there.

SPEAKER: My name is -- my question was about access. I feel the discussion has been focusing on quality, but I was curious to see how this new burst of technology can help improve the issue of access in the United States.

MS. BOYER: We started on our site, so part of what MyNYP is in my mind is it's a virtual entrance to us. We've started with the giving of records. We're actively working now on the access part in saying how can we be more self-service, how can we make it easier to get into our organizations. I think technology can help us with that. I think if you look at the airline industry you have to say when they first said here you can check yourself in, there probably weren't a lot of people checking themselves in. You had to be comfortable. Now everybody checks himself in. So I think it's moving us in that direction. We haven't done as much yet. I'm hoping to move that forward next year, but I think it gives us some potential to do more there.

MR. WEST: What do you think you can do to improve access? What are your plans down the road?

MS. BOYER: So that if you're coming in, you fill out the same piece of paper all the time. My board of trustees is like, why are we doing this? You go see the doctor right next door and it's in the same hallway in our institution. It can't even possibly make sense to yourself. Then you fill it out again on the other side of the hallway because now you're in the X-ray department which is the hospital and not the physician. I think by moving this data this way and allowing them to do this before they come in and use it from their last visit which was at NYU instead of at my hospital, we can start making that kind of self-service improvement.

I think we can also start opening up our availability. Right now it's in pockets. There was this great thing on the web recently from the "National Journal" about if you had to get a plane ticket the old way and call each airline, it's a disaster. That's how health care is. You have to call each office, each X-ray place, so I think we can break that down with this kind of data exchange. I think we're not as far along on that, but I think we can do it.

MR. HEYWOOD: You mean access as in who pays. Right? At some level?

MS. BOYER: What?

MR. HEYWOOD: As in who pays.

MR. LOGAN: I didn't define the question the way you are.

MR. HEYWOOD: I break health care into two actions. There is an information and then there is a problem of execution on that information or actions. Technology, all the doctors in the room can shoot me now, quite frankly can take over 80 percent of diagnosis and management today and should because doctors aren't very consistent or good at it. So you can solve that half of the problem essentially for free. In that case, information technology is free. The execution component -- delivering particularly efficiently and if we did that well, you could lower the costs, but at the end of the day, access I believe as you mean it really means who gets paid to take your appendix out and I don't think technology changes any of that other than make transparent the problem.

MR. LOGAN: I may be misinterpreting your question, but to me an impression health care institution to look at that has done important work is the South Central Foundation in Anchorage. They are the main medical institution that provides health care to Native Alaskans. That is one of the most medically underserved audiences in America, or was, very low English proficiency, and antagonistic to traditional Western medical care. Yet they have been enormously successful over the last 15 years about reversing the entire attitude about going to the hospital seeking care and about the whole concept of taking care of yourself and prevention among a whole population where most people were not pessimistic they would be possible.

Technology played a role in it. They were very aggressive in terms of telehealth. There are special circumstances in Alaska. Patients are often several thousand miles away from the facility. They did a lot with many of the things we've discussed although they are not as advanced some of the folks sitting to my left. But there are other things they did too. For example, they traditional healing seriously and blended it with Western medicine. They found a way to do it. I won't go into more detail, but is it possible to transform how an entire community feels about health care? Is it possible to show not only that, but to greatly improve outcomes? I've been there and I've seen it live. I know it can be done, but it is very difficult to do.

MR. WEST: There is a question over there.

SPEAKER: -- how soon is it before Americans will start using Skype and email to communicate with primary physicians in say India and the Philippines and opt out of having the wait times associated and the costs associated with trying to get to see a primary physician which seems to be -- to your point the incentives are not there for the U.S. to produce any more primary physicians and it seems to be a major bottleneck in the process. I'm wondering whether you see this as in the pipeline using just basic Skype and email to communicate more with doctors who may or may not even be in the United States.

MR. WEST: Are we going to see the globalization of medicine?

MR. HEYWOOD: It's already happening. This is live now. People are doing it now.

MR. MCLEMORE: I would say one company that's emerging that's interesting, it's not international physicians, but it's taking excess in the U.S. physician market and doing real-time on-call, a couple of companies, one called Teledoc and one called American Well because allow physicians if they have a break in their day to do $25 consultations via the web. Both are working with HealthVault because one of the things that's critical when you do that is having the continuity of care between that person who provides that online consultation and perhaps your primary care physician if you have one. Another example is certainly international medical tourism. We announced last week that we're integrating with one of the leading hospitals in Thailand that does international medical tourism and they see about 50,000 Americans every year who travel there for lower-cost care that is delivered at about 25 percent of the cost for the same procedure in the U.S. and one of the things we talked about was using something like HealthVault to make the continuity of care be very effective so that when you get the discharge summary from Bangkok and you end up back in Washington, D.C. you can share that information digitally with your provider. I know that's not a direct answer to your question, but those are a couple of interesting trends.

MR. WEST: How is this going to affect your business model if patients start doing this?

MS. BOYER: In essence we are not a primary care institution in a great way. We are a place that you travel to already. But I do think these are challenges to the entire health care industry. I don't know that I'm the right person to answer it. What I believe my institution to do and will do and other institutions will do is change based on how the world changes around us. I do believe that it is an international business now. It's important for us to have an international presence when it wasn't before, and so that does impact us. It is impacting how we run our business and the kinds of things we're doing. And I think we will let it play out. Let's compete.

MR. WEST: And America may be importers and not just exporters of patient.

MS. BOYER: We are.

MR. WEST: There are foreign patients coming to the United States for treatment. Yes, there on the aisle.

DR. POPLIN: My name is Dr. Caroline Poplin. I'm a primary care physician. I've practiced medicine for the last 15 years, and before that I was a lawyer. There are two problems that you haven't mentioned at all that have to do with electronic medical records. First of all, we don't get paid for reading them or writing them, and what that means there is no time in the day. If I have to see 30 patients, the last thing I want are emails from your truck driver with his blood pressure particularly if they're high because that's something I can't neglect. If writes in that he's 200/100 I have to do something right away and I don't want that sitting out there like a landmine.

The other thing is you've got to make the records useful for us. When I started in medicine we had nurses' notes in the hospital, one note about what the patient did, he got out of bed, then he threw up and went back to bed, then he had a psychotic break, then he ate breakfast. Now we have a list of boxes that are checked that's useless and nobody looks at it. We have notes from the residents. The residents are very clever. They're young. What they learn how to do is copy forward, so we have 15 versions of the same note and no one writes off service notes anymore because there isn't time and the reason there isn't time is because nobody pays for that. When I was a lawyer I was paid for reading records. In fact, it was unprofessional not to read everything you had before you came to a meeting, and in medicine that's just standard procedure.

MR. MCLEMORE: I think you reinforce the point we've been trying to make about, and perhaps you didn't say it very well, about how payment reform really needs to drive the types of changes that will deliver a sustained adoption of technology so that physicians are paid to look at readings from patients when they're not in the 7 minutes they come in to see you as a physician, so that physicians are rewarded for that type of thing, so that hospitals are incented to be accountable for the patient more broadly, not just when they're lying in the hospital bed. So that's what we mean by payment reform, thinking about those things that will fundamentally make economic sense for providers to use this technology because as Jamie and others have pointed out, there is not a lot there to have it make sense in the daily workflow today.

MS. BOYER: I think all of those things are true and certainly we're all trying to do a better job, besides the incentives which I do think impact how your life is and then we're just throwing stuff on it, you're talking about a problem that I feel is what we consider the medical record, the chart, when I was a nurse was a communication tool and therefore it was helpful to you. Now it's a documentation tool so that you hate the EHR for the wrong reason. The EHR isn't saying you got to put these checks in, it's the requirements that accreditation agencies are putting on us, our regulations are putting on us and it's driving into that place and as an industry I don't think that's a technology problem, I think it is part of what we're struggling with. So having the time and using it as a communication tool, we're really struggling and we're inventing things on top of our EHR that are communication tools. So I think that's getting lost and I do worry about that too. I hear you and I feel it. I really do.

MR. WEST: Near the back.

MR. SHAVEN: Paul Shaven with Washington Hospital Center and Georgetown University Hospital. We're engaged in developing a regional health information network in the D.C. area and the biggest barrier has not been that we're going to perform fewer tests because some of our patients won't pay them anyway, but it's regulatory reform. We've spent more time trying to deal with the regulations to protect ourselves if we share the data than with the technology. Could anybody comment on what's going to be done for regulatory reform to help provide incentives or at least protection as we try to share the information?

MS. BOYER: I walk in your shoes so I'm sympathetic. I think at some of these forums that a lot of go to now when we're talking about connecting the system, these issues around state laws versus federal laws, privacy laws, tort reform, I believe the federal government is going to have to step in and reconcile some of these things because they are real barriers to us, not only the business barriers which are I think part of that, but those are certainly out there and I think people are going to have to step up to the plate and get some changes. The laws are not allowing us to do all the things we'd like to do.

MR. HEYWOOD: I think there's a communications issue we need to deal with here. I think it's fairly clear that we kill thousands and thousands and thousands of people every year to protect for 10 to 12 lost jobs and I think it's so absurd that we need to say this is crazy. It's like literally a Vietnam War worth of deaths every year in the interests of protecting an abstract concept of privacy that's just doesn't really even cause any harm. So we live in a country now where if you take the principle that all are created equal, the way we have chosen to enforce that is to say that you may prescribe or communicate any inequality, not that you may not discriminate against inequality, so we allow discrimination and punish communication and it's insane. The deaths to medical injuries, the deaths from slowing of advancements of medical care, the deaths in delays in clinical trials, in understanding hospital information systems, the fact that 70 to 80 percent of every meeting is taken up with what if someone found out that X-Y-Z was Y against absolutely no evidence that I can see that that ever happens, ever has a real problem, or results in any real harm. It's just got to end. We just got to stand up and say it's time for 747s to stop dying because the aircraft controller got sick. It's stupid.

MR. LOGAN: First of all, the last couple of questions were I think very helpful. I'm disappointed when I don't hear people who are in leadership positions regardless of what sector they represent including the federal government, when they talk about these issues and they don't discuss incentives and they don't discuss regulatory reforms I think it's an incomplete discussion and I think we're all in agreement about that.

I'm a little more optimistic than some of the people on the panel are simply because if you look at the hospitals that are part of the system in Indianapolis, if you look at the hospitals that are part of the system in Salt Lake City, those are two cities where for the last 25 years there has been a consortium of hospitals that share patient information. In some cases patients have access to it, in some cases they do not. But if you look at the quality of care there and you look at the enthusiasm and a generation later among the primary providers and the administrators of those facilities for doing those things even though they were the innovators and early adopters and they took all the hits, they still not only have the data, but qualitatively you see a different approach and a different attitude about health care. It's doable. It can be done. It's been done.

MR. WEST: I think we have time for one last question and we'll take it right there.

MR. ALTMAN: I'm Fred Altman. My question is on diagnosis. How long will it take to use the medical records to improve diagnoses to get a list of percentages of what might be the cause and then information about how to reduce the number? That's obviously important for the physicians. It's also important for individuals to stop going with the disease of the week.

MR. WEST: Good question.

MR. HEYWOOD: I think there has been some diagnostic software around -- software that's been pretty good for a while. I think the barrier to making that effective right now is allowing the consumer to interact iteratively with the health care system with data flowing in an effective way, so diagnosis is a presentation, information generation, presentation, information generation process, it's iterative. No matter how much we've gotten to, it's just not happening fast enough or effectively enough and I think there's a lot of it that could even be made virtual, that you could do it remotely and partially effectively where a nurse can come to your office and draw things and do things effectively.

The other side of that problem I think is much more interesting and very exciting and I think as we enter this new age of genomic health care, the definition of diagnosis is going to change really quickly. So if you look at chronic fatigue syndrome which 3 weeks ago was a psychiatric disorder and it's now a viral disorder, that transition is going to happen really rapidly and really quickly and I think that in that case it demands a much more interesting medical dataset which is what is the longitudinal -- measurement of the patient across multiple paradigms and how does that begin to pattern match? One of the things we're looking at, we look at our MS patients on our platform, and I can look at -- we're doing analysis now, but somewhere between 2 and 10 percent of them are not MS patients as far as we can tell. They never experienced impairment of their motor system or cognitive systems, it's pain and fatigue, and they're taking mainline MS drugs. So I don't know if anyone else noticed it, but I don't think Efaxin (?) was approved for us in chronic fatigue or fibromyalgia. Are they getting the diagnosis for political reasons or psychiatric? So I think this is all very interesting and at some level it becomes a wonderful integrated problem of discovery and interactive health care and I actually also am optimistic. I think actually I'm one of those cynical optimists. But you describe very beautifully in your paper what medicine could be and I think there are places where it is beginning to be that. In the next 5 o 10 years, cancer is going to go from being at least for the rich of a disease of the origin of your tumor to -- if my mom had cancer today, I'm sequencing her tumor and her and I'm running the difference and it's been done once already and we could afford it and we do it. So this will become this amazing interactive tool and I think I'm really cautious about locking down the language. I really agree with you about locking down the specifications. Set the goal. The goal is we should know everything about everyone and everything they did in one systems dynamic model of the American health care system and optimizing -- parameters and that is an achievable goal which would transform our economy, health care, the health of the country and make us an amazing place, and we're not even shooting for 10 percent of that right now. That's what I want to do.

MR. LOGAN: You raise as usual a lot of wonderful things to talk about, but one thing we haven't mentioned is the future is mostly patients with chronic disease. Three million people 25 years ago were alive who were diagnosed with cancer after 5 years. The figure today is 12 million plus. Cancer is rapidly becoming a chronic illness rather than acute illness and that's just one of many. What we face in the future is can you help people over a period of many years -- I don't like the term manage your condition, but that's the term that clinicians use. How do we do that better? To me that is another strong reason for health information technology and for its development. Another way of looking at is if you don't want to put it in technological terms, it's the best reason for health education that I know.

MR. WEST: I think we will conclude on that optimistic note, but I want to thank Rob, Aurelia, Jamie and Nate for your contributions and than you very much for turning out.

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CERTIFICATE OF NOTARY PUBLIC

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.

/s/Carleton J. Anderson, III

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