THE BROOKINGS INSTITUTION

HOW MOBILE TECHNOLOGY INFLUENCES HEALTH INNOVATION

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P R O C E E D I N G S

MR. WEST: Good afternoon. I'm Darrell West, Vice President of Governance Studies and Director of the Center for Technology Innovation at the Brookings Institution and I would like to welcome you to this forum on mobile health. And we are webcasting this event so we're pleased to welcome viewers from around the United States, as well as outside of America.

We've set up a Twitter hash tag at TechCTI, that's #TechCTI, for those who wish to offer comments or pose questions. And when we come to the audience Q and A portion, we will take questions both from the live audience here in the auditorium, as well as those of you who are webcasting.

Mobile technology has expanded dramatically around the world. By 2016, it is estimated that there will be over 10 billion mobile devices in use globally. There are more than 40,000 mobile health apps that are available today. So not surprisingly, this technology is poised to alter how healthcare is delivered, the quality of the patient experience, and the cost of healthcare.

There are amazing new initiatives taking place in the United States, as well as around the world. We're putting out a paper today and I will summarize a few of the highlights. Physicians in Mexico, China, and Africa are using mobile devices to manage chronic diseases.

In Mexico, for example, diabetes is a huge problem. The illness has increased 25 percent just over the last seven years and 14 percent of the Mexican population that has diabetes is younger than 40 years old. So certainly the looming crisis in Mexico, as well as elsewhere, is going to be enormous as that disease adds to

healthcare costs and complicates patient care.

Now there are remote monitoring tools that record glucose levels and electronically send that information to healthcare providers. The physician can see what is happening with the patient without that individual actually being in the doctors' office and can recommend care based on the monitoring recordings.

Bob Lighten, of the Brookings Institution did a U.S. study and found that remote monitoring technologies could save as much as $197 billion over the next 25 years. Mobile devices also can help to reduce the gap in medical care between rural and urban areas.

In most countries around the world there is a substantial disparity in access to healthcare based on geography. And mobile phones, as well as telemedicine applications, enable people who live in the country to gain access to positions through these remote audio or video connections. And so that helps people overcome geographic isolation and get access to better medical care.

In one study, nearly one quarter of nurses said that mobile devices have helped them avoid medical errors. Doctors also can use text messages to remind patients to take their medication. This is an important improvement because in some studies, half of patients have reported that they don't take their medications either at the proper time or in the proper dosage. So physicians are experimenting with text reminders for people to both take their medication and also to get exercise.

Some studies have found that those getting mobile reminders increase their exercise levels by up to two and a half hours per week. Although, I'm hoping my doctor doesn't get that idea to send me text messages on exercising.

By 2017, the mHealth field is expected to become a $23 billion industry worldwide. So there are lots of amazing things taking place. But in many countries, there remain major policy barriers to the adoption of various mHealth applications. In the United States, many insurers do not reimburse for mobile care, so this limits healthcare innovation.

There also are questions about the Federal and Drug Administration and the possibility of regulating mobile screening and diagnostic tools. So that's something that I think everybody is paying close attention to.

This paper and this forum is part of a three year mobile economy project that we are undertaking at Brookings and we're very grateful for the generous financial support provided by Qualcomm for this project. It's enabling us to undertake research and hold policy forums on various aspects of the mobile economy.

Today we're pleased to welcome a number of distinguished guests to help us understand mHealth. Alain Labrique is Assistant Professor in the Departments of International Health and Epidemiology at the Bloomberg School of Public Health at Johns Hopkins University. He's undertaken research on infectious diseases in Bangladesh and South Asia, among elsewhere. He's working to develop mobile information systems to facilitate timely emergency care for neonatal and mothers in some of these countries.

Julie King is Mobile Executive Business Lead at Humana, a leading healthcare provider. In this position she leads the company's newest communication channel, mobile health, and Humana has won the first ever Appy Award for best medical app that was developed last year.

Antonia Marttos, Jr., is an Assistant Professor of Surgery and Director of

the Global e-health Program and Co-Director of the William Lehman Injury Research Center at the University of Miami. That sounds like three full time jobs to me, but. He has created a statewide trauma telemedicine network and received the Health Department's outstanding leadership award. He also has created a global telemedicine program to provide trauma telemedicine support in Iraq, among other places. And this program has used a 3G enabled robot to provide trauma care and trauma consultation. So it's just one more way in which we're seeing lots of new experiments taking place.

Morgan Reed is the Executive Director of the Association for Competitive Technology. He represents 6,000 small and midsized application developers and works to promote small business innovation. He also is a member of the Mobile Initiative Advisory Council for mHIMSS, the Health Information and Management System Society.

So to kick off our discussion, I'd like to start with Alain. So can you tell us about your work and how mobile devices are being used to improve care and connect to clients?

MR. LABRIQUE: Sure, David. Thanks for holding this panel and inviting us today. I just want to say another privilege that I do have is directing the Global mHealth Initiative at Johns Hopkins, which constitutes 60 faculty and 150 students. Within the last year we have come together around this potential of technology to connect individuals and create new opportunities to improve health globally.

You know, as you presented the wide landscape of mobile technologies, mHealth, I think what we focus on is how do we use this technology to enhance access to health education, training, and services, but also the delivery of health education, training, and services to communities who have normally been disenfranchised and out of

reach. So in global health terms, that bottom billion of the global population where the millennium development goals of reducing mortality have been the hardest to accomplish.

A simple way that we like to phrase the potential of mobile health on the global stage is really in three words, connect, compress, and create opportunities, where the mobile technology enables a community health worker or a provider to connect with a widely dispersed rural population in communities where sometimes we have birth rates in the home as high as 85, 90 percent of the time.

Compressing the time between a crisis and the response to that crisis can mean the difference between life and death in communities from Uganda to rural Nepal. And I think what we've seen with mobile technologies, as they've been introduced in these ecosystems, is that having access to a phone to take better decisions within a shorter time really does have an impact on that survival. And so we're trying to build the evidence base behind how much that technology actually can have an impact in these rural resource limited context.

But there's a divergence in the mobile health field between domestic high income settings and what we see as the global mixed income, and really low to middle income context, where in the domestic context, besides enhancing clinicians' access to information on the spot, in your hand, so the modern pocket guide, if you would, we're also talking about EHRs and focus on the technologies themselves. So the ability of these technologies to enhance access to imaging, sensors, accelerometers, other things that give us deeper insights into the patients' status at any given time.

But globally, what we -- when we look at mHealth as a strategy to

accelerate progress towards the millennium developing goals, what we're looking at is as a human performance enhancement technology. So how do we enhance the performance of the boots on the ground, the frontline health workers who are providing critical care to hundreds of families across rural South Asia and subs here in Africa?

Connecting them with a continuity and a quality of care that before these technologies existing, they did not have access to. So ensuring that children receive vaccinations on time is something that we're working on right now, creating a virtual vaccine record to be able to hold the system accountable, that every child gets vaccinated, not just completely, but in a timely fashion.

We also want to improve coverage of known efficacious interventions. So we know certain things in public health do save lives, do reduce mortality. Giving vitamin A to under five children, giving vitamin A to newborns, providing vaccines in a timely and complete way, ensuring that women have access to contraception, these are things that strategies that do save lives. But can mobile technologies improve the coverage and access to these technologies are the questions that we're asking right now and trying to come up with the evidence to support the integration of these systems into national health policies and strategies.

But I think we're also at an inflection point, David, where mHealth implementers, investors, researchers, are realizing that the pilot-itus of yesterday, the one shot pilot programs that didn't go to scale is not where we should be focusing our energies and our investments. But really thinking about how do we mainstream mHealth into health systems.

How do we integrate these technologies to enhance the way we deliver

public health on a global scale? How do we make these technologies help us do things better? And so that's really the question of developing infrastructure in these countries and strategies to enhance health systems, is I think the way that we're seeing this technology enhance global health.

MR. WEST: Okay; thank you. Julie, you work on various aspects of mobile health so how do you see mHealth transforming healthcare delivering and the patient experience?

MS. KING: Thank you again for having me. And first I want to say we all know that our phones are very personal. In fact, I'm a little bit shaky not having my cell phone out here and I imagine most of you that are on the web and in the room right now have it very close at hand, right, and I encourage you to Twitter and ask your questions while we're talking today; love to get your perspective and questions.

Humana really is here to manage 11 million members and we've taken a very practical approach to providing the information that a member needs at their fingertips while they're at their provider or on their way to their provider or to find a provider. It's really a way to navigate the healthcare system.

So what you'll find is an app, a mobile website, and also text messaging that all help facilitate that care management and the facilitation of managing the healthcare system.

So individuals can find a provider, a network, an urgent care center, they're able to have their id card with them with their phone, whether they have a wallet with them or not, fax that information to the provider, have their claims with them, including their drug claims that might help them with that conversation with their doctor,

understand the status of that claim, then understand how much is left in their spending account balance, how far they've met their deductable, they're able to actually even refill their prescription right on their phone and get text reminders to take their medication or that a refill is almost ready for them. So these are all ways that people need to navigate their healthcare system.

But it's pretty complex and instead of waiting until you're on your computer at home to find out whether or not a medication that your doctor has prescribed is within your budget, you can do that while you're with your doctor; find out what the cost of the drug is going to be and whether there's a lower cost alternative and where to go get that medication.

So we've taken a very practical approach of making sure that members get what they need at their fingertips, where they are, in that context, whether it's at the ER or at the pharmacy.

In addition, we've taken steps to be a bit more innovative. We've taken on some games for health to test out this theory that being healthy is fun and making some fun things happen while you're becoming healthy. And we also have encouraged fitness and nutrition and done that through a reward system using our mobile technology as well. So you'll find that we have some administrative needs that are met and then we're also trying to encourage healthy behavior.

You'll see in the future some of the work that we're doing in biometric monitoring as well. Really, I think it's taking a step at a time and you'll see that health insurers are taking those first steps to make what our members want at their fingertips where they need it.

MR. WEST: Okay. Antonio, you've developed trauma telemedicine systems in the United States and Iraq and as part of the upcoming World Cup, we understand you're working with people in Brazil. Of course there could be a lot of trauma associated with that World Cup so they may need this. But I'm just wondering how are physicians using some of these new tools and what are you seeing around the world?

MR. MARTTOS: This is very important. So in the clinician sides, in the physician side, we need information. Sometimes in minutes, sometimes seconds to make a decision. They're going to -- can save someone's life. So it's very important to know everything or as much as you can about your patients, right? So can you imagine your life without the cell phone?

MR. WEST: No.

MR. MARTTOS: I remember the first time I had internet it was one minute to load like a CNN webpage. Do you imagine your life without internet now? No way, right? So for physicians, I think we are a key moment right now, that in the future there's no way to do -- practice medicine, and a good standard of care, without mobile health.

Why? Because it not only provides healthcare access to everybody, it's about what's the quality of healthcare they're going to provide. What kind of physician, what kind of nurse, what kind of human beings are going to have access?

So when I have a patient in Key West and needs carried to -- sometimes they need to be transferred to Miami. It's a one hour helicopter flight. So how can I help the remote physician, the rural physician, to take care of that patient initially? What kind of maneuvers, what kind of procedures can be done for patient safety before putting him

on the helicopter?

How can I monitor my patient, this patient, during a transportation? So he's going to be one hour in a helicopter so by now using 3G I can monitor the patient, can see the vital signs, I can see the O2 saturation, can see the EKG. I can be ready to receive this patient.

So doing everything that we did, it will truly believe that mobile care is now, is going to be a crucial change, and the physicians are starting to understand that and the people, the human beings of the populations will need to understand that if you have access to information we can save your life. We can make better decisions.

There's no reason why a physician in Iraq, like I've been doing for the last -- since September, or in Key West, or sometimes a remote location is 20 miles from her, a physician, you never need to be by himself anymore. I always can have help. I can have support for information to make a decision, to provide the best care for the patient. That's why developing this system in Iraq to support Americans that are there, so by now 24/7, somebody had a problem we provide that medical device.

That's why developing this for this big event in Brazil with the soccer World Cup and the Olympic games where I've had somebody from Japan, from the United States, from Israel, from South Africa, from anywhere in the world, from 205 countries, they would be able to access the best care available.

Why? Because we are -- we would like to have access to information, allergies, medications, basic medical history, and connect a physician from Brazil that's going to be taking care of this patient to a physician in their home country. And because there are different stages of care in medicine, for sure; the medicine that you have here in

the United States is different from Africa, different from Brazil, different from Japan.

So the idea is -- the globalize -- once you have the best care available always, using all of these tools that are available for us right now.

MR. WEST: Okay; thank you. Morgan, you work with the Medical App Developers, so could you tell us a little bit about the application side of this in terms of what are the apps that are out there and how they are being used to help on healthcare?

MR. REED: So I'm the nerd. That's my job up here today. You heard how the physicians are going to make us healthy, how globally we'll have these huge opportunities to save lives and provide better care. But somebody's actually got to make that stuff work. Somebody's got to sprinkle the magic fairy dust that actually produces all of these products.

You know, I thought about coming up here and talking about my -- the grind of my life right now, which is dominated by the acronym soup from ACOs, the HER, PHR, EIA, I mean HIEs. I figured at some point in time if I said the words meaningful use somebody would go bingo and we'd all move on since the acronym soup of our healthcare world is so dominated by these terms.

But I decided it would be better off to rise up a little bit to more of a 30,000 foot level and talk about how we are going to provide this stuff that you just heard about throughout the entire supply chain, so to speak, of mobile health. And when we talk about mobile health, we tend to focus on little aspects of it. So I thought let's bring it up a little bit and let's look at it as a triangle.

There are really three parts to mobile health. The first is acquisition; all right. This fit bit is just a sensor. How many of you have seen a fit bit or heard about it;

hands? Excellent; all right. So this is a sensor I attach to my body that has a bunch of information that comes from it and that I can put up in the cloud and then eventually it will probably make it into my medical health record in the future. But you know, it's not just this, it's this.

Have you guys seen these in the store? It's a blood pressure cuff that ties to my iPhone and provides information. It's another form of sensor but it's not a mobile phone. However, I would call this a mobile, part of a mobile healthcare solution. I don't go to my doctor's office. I don't have to get the readings. I can actually take the information from this and provide it to a physician or I can even provide it to my friends and do whatever I want with it.

And so acquisition and sensors are really the first element of the mobile explosion. I mean this is -- this is an incredibly inexpensive device to make really. And so this is where it's going to be. And before you all think, oh, well that's kind of silly syfy, here's the easiest way to think of it.

Looking at the crowd, some are too young but most of you remember the help me, I've fallen and I can't get up. Remember those? They sold millions of them, millions. So when this device starts keeping track of grandma's heart rate and can actually tell the son or daughter who moved away, who feels guilty about their baby boomer parents not being at home and can say grandma's having a heart attack or grandma's showing some forms of health things I don't like, her blood sugar is too low, et cetera, et cetera, there are going to be a lot of reassured hang ringing -- no, hand ringing kids who are going to say ah, there's a device that's keeping track of grandma. These are going to be everywhere.

And the information coming from them will make it into EHR, PHR. That's going to happen. How and what we do about it and how HIPPA compliance works, that's what we're working on in the backend, but never for a second think that that isn't the reality. And that's the consumer facing aspect of it.

The second is display. We talk about mobile. I'm holding this and I eat my own dog food, I do my notes, actually using my iPad, for my notes for when I give speeches. But you know, the other cool part about this in the mobile space is the display aspect of mobile, right. Our phone is really just a display for information that we get from the cloud or from the hospital computer system.

It's really just a -- it's a front end. But you know what? It's a front end that has clinical implications. Because one of the apps on here that I can show is airstrip. I don't know how many of you have seen airstrip. It's pretty cool. It's an application that actually allows me to monitor fetal heart rates or existing heart rates of multiple patients at the time. But the actual display technology of this makes a difference in my clinical care because I can actually, with just a couple of clicks, I can actually go back and forth through a patient's heart rate and see what has it done. Oh, it's dropped over the last 10 minutes? What was it two hours before? How about three hours in advance? Let's blow that out a little bit.

My wife likes this for the ability to do ultrasounds, to be able to spread them out and look at it and rotate. So the display aspects of this are very important, but don't just think about this form factor. The show is kind of cheesy, but Grey's Anatomy actually had some technology they used about a year ago by a company called Internology that has an actual touchless operating system -- operating room so that you

don't break protocols and you can actually look at, pull up images, really minority report stuff. It's using the Kinect head.

So that Xbox 360 your kids are playing with, the head off of one of those is actually providing a touchless operating theater. And that is also mobility because the doctor is mobile.

The fact that it was a specific device that's displaying isn't really important. And then probably the biggest aspect of those of us on the nerd side that we're having to deal with is management, because as I said, all of these sensors are going to pump data into my EHR, but they're also going to be able to provide information on populations; right. How do I manage keeping your information separate, but your information together to know if we have a cluster, to know if we have a population that's at risk, if there's a treatment that we need to do?

So I need to keep your information separate, but your information collected. And that means dealing with aggregation and enmity and all of the privacy issues that have risen up.

So really when you look at mobility, it's really more of a triangle and not just bullet points because we have to find a balance between sensors, display, and management of the information that we need to show, a need to catch, a need to give to our wonderful doctors here that will actually save lives and be part of making the world a better place. So my job is to make sure that the technology that comes into the backend makes what they're dreaming possible.

MR. WEST: Thank you. So we've heard a lot about cool technology here. So I'd like to pose a question about outcomes and anybody in the panel who wants

to jump in can do this because it's really not just about the technology. The point is to use new tools to either improve healthcare outcomes or system performance; cost savings, quality measures, or so on. So the question I want to pose is what do we have in terms of evidence about the actual impact of some of these very interesting innovations that you've talked about; what's working, what do we need to find out, where is that link to actual outcomes? Anybody who wants to answer.

MR. LABRIQUE: I mean I can take a first stab at that. And we often hear this question of, and you know, we introduce ourselves as public health technologists. People ask us about mHealth and does it work. And that's a very frustrating question because it can mean a number of things depending on what you're talking about. Are you talking about functionality? Are you talking about usability? Are you talking about improved outcome or reduced costs?

And so I think across those series of questions there are different types of evidence that have either been generated or are in the process of being generated that lead us towards selecting a particular technology or another.

I mean one term that we've tried to popularize it and public health is technology agnosticism, which I know is difficult in some spaces when the solution depends heavily on the technology itself, but would we ask our students who study mHealth is, you know, ask ourselves what is the public health or clinical principle which this technology is impacting. Are you improving the adherence to a particular set of guidelines? Are you reducing the time that it takes a nurse to realize that a NICU patient needs to be transferred to another department? So what are those strategies that -- our public health underlying strategies that you're measuring and looking for outcomes?

So you know, there's a lot of talk, both domestically and internationally about the need for rigorous evidence and a strong evidence base. And we traditionally have mechanisms and methodologies that we use to test new drugs, to test new clinical practices, standardized methods include the randomized control trial.

I think right now, if you go to clintrials.gov, the government repository of registered community and clinical trials, there are about 160 current randomized trials that have mobile health or mobile technologies in their keywords.

So there are -- that -- that strength of evidence is on its way but there are certain things that we do already know works. Text messaging, for one, you brought up earlier, to remind patients to take their medications when they're sick is a strategy that now we have a number of randomized trials that have shown sending text messages improves adherence significantly.

How much evidence do we need before going to your -- before going to your -- before when you go to your clinician, he hands you your prescription and signs you up for an adherence app on your phone that will ensure you take all of your antibiotics, or your antimalarials, or your antiretroviral treatments. So I think the body of evidence is growing but what we lack is some type of structure or guidance as to when the evidence is sufficient to now move it from the experimental space into practice.

MR. REED: I actually think his framework is a key element to this because it's not about whether or not it's on this, or that, or one of these other gewgaws I've got in front of me. It's -- is it delivering the same information that you might want to provide clinical care in a new way that enhances its value.

I mean you just heard him talk about providing information about

medication. Well, if patients take their medication better it saves you guys money and if we can gamify that, that's the term we use, if I can gamify that activity so that there's rewards attached to it and that gets even a higher increased rate, those are actual things that I can do that aren't really any different.

If you think of it in the old world, text messaging is a much more efficient way, but theoretically, you could have a nurse call up every patient at 10:00 every night and say Mrs. Smith, did you take your medicine. That's horribly inefficient. Text messaging is a far better way. And you know, I could have Mrs. Smith, you know, I could have a nurse on the phone saying Mrs. Smith, I'll play tic tac toe with you if you finish your medicine. I mean I could gamify that phone call.

So the mobile aspect of it isn't actually transforming it in the sense of what you're trying to accomplish. It's making it more efficient, more effective, and I think ultimately more valuable. So I think that's why, you know, we talk about acquisition through sensors and display, the same thing goes for display.

If I can do more with the health record that I'm reviewing on a mobile device, then I think that that actually has value. But I think Tony raised a good point earlier, which is about culture.

And I think that some of these changes are going to take time because we're going to have to go through some cultural transformation, both on patient side and on provider side before we will get -- we will really be able to extract all of the value out of these tools for a display and the sensors for capture, and even the management so that Julie's folks can really be aware and cognizant of the populations that they're trying to help.

MR. WEST: Julie, what are you seeing in terms of the impact on outcomes?

MS. KING: Yeah, I think we really are at that early stage. We're at -- in the experimental stage. And I do agree; it's a tool to care management. It in itself I don't think will be able to be measured as its own capability alone. Those other programs are care management programs or are comprehensive programs and this is a component of it.

I think it's going to take a bit of time. What we can expect is that those randomized control trials are going to lead the way in terms of policy. But what you do see are health plans testing this, whether or not it's been proven or not. So you see Humana testing out this biometric monitoring, you see them providing medication adherence, text reminders for example.

So we're not waiting for that analysis to make those kind of tools available to our members and it's not only what they do, but it's also where they do it. That's what makes it relevant. It's where you are sitting. Are you at home, are you at the beach? Every moment, if you have a chronic illness, you're managing that condition and having those resources available to you, wherever you are, is really what makes it a tool that's valuable on top of the other care management that you're getting from your doctor or from your health plan.

MR. WEST: Antonio?

MR. MARTTOS: Yeah, being an academic institution, I have the privilege to test everything. So before implementing any clinical solution I test it. So when I had those grants from the Department of Defense to test remote monitoring or

remote (inaudible 00:32:40), when I receive something wrong, everything I was able to test and I was able to prove outcomes. So (inaudible) critical care units, you can early recognize problems just -- you send and receive a phone call from my physician and I can -- receive information that he's seen.

But on the other hand, just to go in there with a smart phone and see the monitors, see the (inaudible 00:33:05) the nurse, the same outcomes. I can earlier recognize problems that otherwise would be recognized only the next morning and can -- I can help to locate your -- save money with transfers, save money with helicopter transfers.

And again, the way to convince the insurance companies is to say listen, maybe you need to invest a little bit more in front to save in the future. And that's where we are right now is a cut throat real moment, or a key moment, and again, these new technologies are going to be key for improving healthcare and the quality of care in this country.

MR. WEST: I have one more question and then we're going to move to audience Q and A. And the question concerns a government regulation of mHealth; and it's a two part question. One, within the United States the Food and Drug Administration is thinking about regulating mobile screening and diagnostic devices so I'd like to get, you know, some sense of where we are on that and what you think the FDA should do in that area. And then the second part, for those of you who work outside of the United States, how are other countries approaching mHealth, specifically in terms of government regulation? Morgan, do you want to talk about the FDA part of it?

MR. REED: Well, I think what's really important to note is that medical

devices are regulated by the FDA whether or not they appear in this form or in some other clinical form. You know, again, back to the mobility question, most of you who work in a hospital you know what a cart is; you've seen carts, right; a lot of that stuff is mobile. Right; you push the cart around. They're starting to use Bluetooth. It uses wireless networks to connect back to the network itself and yet it still has to have FDA compliance and it has to deal with HIPPA.

So within the mobile health space I think it's very important to note that the FDA is struggling to figure out how to work on some of the blurry lines but there are some bright line activities that are absolutely in the FDA's prevue and it doesn't really change depending on how the device is, as Alain was talking about earlier, about these being more of technology agnostic.

That said, I think that right now we're in a stage where it's very hard for us in the tech community to move forward while we await the FDA's rule. So we're really hopeful that that rule can get out quickly. I'm sure that we'll have concerns about it. I'm sure there will areas where we'll still need to nitpick and we'll have to have more in depth discussions with the FDA proper.

But at this point in time, to move forward to do more really, truly innovative stuff, we'd like to see the FDA move forward very quickly. So in that regard, I think that the United States -- we have a push me, pull you kind of situation with technologists envisioning a lot of new creative stuff and the FDA moving a little more slowly than we'd like, but hopefully, fingers crossed, we can get that rule out quickly and start rolling out new pilot projects and new technology.

MR. WEST: And how about other countries? How are they approaching

mHealth, specifically in terms of government regulation?

MR. LABRIQUE: So Darrell, 83 percent at the last count of U.N. member states have some mHealth service that they report, either as part of their national health strategy or as standalone programs or pilots. So clearly there are global end roads being made in mHealth, but what is lacking, I would say, on the global stage is consistent and uniform guidelines or the standards across countries that allow operators to work with clinical systems to implement mHealth solutions in these settings.

There are a number of countries, however, that serve as good examples. Rwanda, South Africa, Uganda, Bangladesh, are all countries where mHealth and eHealth strategies are explicitly described in the national health strategies. There are provisions for interoperability standards, there are provisions for common data definitions and architectures to allow different mHealth programs to interoperate and speak to one another.

But part of the challenge, I think, in the global health space is that we're now talking about a change in status quo. If you think about the past five, six decades of how global health programs at national levels have evolved, we now have a new player, the Telco industry that has now joined the fray and is wanting to be part of this novel approach to global health.

And so I think it's -- there's some novel ground to understand how to play well with this commercial private sector partner in the provision of health to a majority of populations where care is provided by government health systems.

So I think there are good examples of policies being set by national governments but there's also a lot of room for guidance, innovation, and I think sharing of

common lessons learned across these emerging economies.

MR. WEST: Antonio, what do you see happening around the world on this?

MR. MARTTOS: Yeah, I see some countries moving faster than other ones and I would say the example Brazil. In Brazil you have 200 million people living over there and 50 million have access to private insurance and 150 million they have, the social insure, the state insurance -- healthcare insurance. And then it's easier to -- for Brazil, for example, to have like a national wide system of policies for mHealth for healthcare. And they are doing pretty well.

So I can see countries that the state manages healthcare more than others. They ought to have -- it would be easier to implement in these policies these new networks. (inaudible 00:38:55) to discuss this. I really think that you need to move a little bit faster with this matter.

Again, it's key. It's important to provide care to be able to help physicians in rural areas where the specialist is not available to take care of patients. But I see some countries moving faster than the United States in this area.

MR. WEST: Okay. We'd like to open the floor to questions from the audience. So again, those of you who are watching this over webcast, you can ask questions at Twitter #TechCTI, that's TechCTI. Stephanie is monitoring our Twitter feed and we have a question from our webcast audience.

SPEAKER: Yes, we have a question from a woman named Lauren Alexanderson, and she's a public health communications professional in Washington, D.C. She asks where do we need to focus right now to move from evidence to practice.

And she is specifically looking at more technology, more management, or more research.

MR. WEST: Good question. What do you think? Julie?

MS. KING: I think we need to move. I think that it really is about testing out all of those kind of opportunities. The evidence will come and the evaluation will come. It reminds me of actually the disease management industry that started in the early '90s and we weren't really sure whether or not it had an impact. It's that early stage of product and of service and care management.

I think we've got -- we have to implement and then evaluate as we go along. There really is only one way to evaluate its impact and that is to deliver it and to create a good set of evaluation standards so that ultimately we can make it a part of how we do business every day.

MR. REED: I think the problem with that question is there's too many moving pieces. I think there's some of it where the efficaciousness is pretty obvious on its face or at least it can be rolled out and tested very quickly. For example, test messaging about take your medicine. All right. And rolling those out you can do multiple alliterations of those kinds of activities.

There are others, I think, where the writer probably isn't even thinking about it but we need to test the efficaciousness and functionality of how we manage data. Are we providing the data that the clinicians need at the time that they need it? Are we manipulating it in the way that they need it so that we're tying two key pieces of information together? Because the reality is humans don't deal well with numbers.

Information visualization is huge. I mean I think that's why, you know, Microsoft has been very successful with Excel by allowing us to do pie charts instead of

just rows of numbers. So one of the questions is we need to figure out what are the best ways, and this talks to user experience, something that the mobile space is very good at, how do we tie two critical pieces of information together so the clinician can see it, as you said, right when he needs it to save seconds, minutes, or day, you know, days of time that it would have taken.

So we have multiple parts of this story and they need to have different schedules of testing and different schedules of oversight and how do we determine it. Some of it we should just be iterating, iterating, iterating. You know, if they don't like tic tac toe, let's try checkers. Let's just keep moving through until we find one that pops. And I think that's going to be part of it. So I think it's too hard to just pick apart mobile with that question.

MR. WEST: Do you want to --

MR. MARTTOS: Yeah, first thing, I think we should have used the common sense, you know.

MR. REED: Right.

MR. MARTTOS: You know what's good, you know what's going to work; don't need to solve every single new device that is in the market. We need to use the ones that are really going to impact us. And we did a nice research about human factors. We interviewed physicians. How is it to have somebody watching you, helping you, is like a big brother, right? And for our surprise, 90 percent of them, they like to have some help to have access to information, et cetera.

And when we start to (inaudible 00:43:06) in Iraq, the first case, the second case, the third case, before the case the physicians were well, do I really need to

do that and after the case they are just touching their hearts and saying thank you very much.

So it's time to work with the human beings. The technology is there. The technology is there, the knowledge is there; you need to make the human beings, the people, understand how to use the (inaudible 00:43:27) tools and this is going to happen. So sometimes we need to go to clinical -- to use this clinically then the people, the physicians, the nurses, the -- and the population, they're going to understand how important this can be and how this can change the healthcare.

MR. WEST: Alain.

MR. LABRIQUE: So Darrell, I mean, I'll build on something Morgan just said and that's there are technologies that are intuitive in terms of improving process efficiencies. So things that just makes sense and seems to make things that physicians and public health practitioners do easier.

But without wanting to seem like a Luddite, because I have a high geek factor as well, there's also a certain risk involved that we do have to understand that technologies that seem intuitive, like electronic medical records, if they are implemented poorly, constructed poorly, or fail to perform as intended, can have consequences, not just in terms of diverting investments away from other parts of the health systems, which in some countries, has significant potential harms at a public health level, but can also have adverse clinical outcomes.

So a failed EMR that doesn't respond adequately or identify a missed visit or a downward tracking CD4 count, and the clinician is expecting the system to do certain things for them, can actually end up harming that patient. So I think -- there is

need for innovation in this space so we have to be cautious about stifling innovation, or not stifling innovation, but allowing, you know, a thousand flowers to bloom but then we're at this phase, as someone very nicely said the other day, where it's time to pick a number of those flowers and make a bouquet of things that work and start to move forward into the implementation space. So I think it's a careful balance of what are the risks and potential benefits to the client and or the patient.

Ultimately we're all -- all of us, I think, are here with the desire to improve outcome and reduce costs. But I think we never want to move forward with the risk of adversely impacting patient care.

MR. WEST: Okay. The second question from our audience, right here on the aisle, is a question. And if we could get your name and your organization please.

MS. KLINE: Hi, I'm Andrea Kline and I'm a development consultant, particularly with the nonprofit community. Two questions; one is with regard to risk management issues. How is this going to impact, let's say insurance for hospitals and doctors, that error ratio? And secondly, what's the impact going to be on the cost to the consumer, particularly when we're talking about spectrum and the wireless industry changing the way they're going about their billing?

MR. WEST: Okay; good questions.

MR. REED: Well, I'll start off with the spectrum right off the front. We need more. We need more spectrum and we need it now. The biggest concern that we have in all of these devices that'll all start using different wireless networks is that some bus load of 20 girls watching a high definition Justin Beiber video will make it more difficult to get the communications that a hospital or a practitioner needs.

Now obviously there are offloading to Wi-Fi systems, there are other things that we can do, but the reality is is that the change in our behavior is a good thing, but that means that the government needs to free up some of the spectrum that's available and we need to move very quickly because it's easy to talk about Wi-Fi hotspots and problems like that, but I like Starbucks, but Starbucks is not a telecommunications provider.

The fact that it has a Wi-Fi hotspot is really nice, but my willingness to accept failure when I'm having a cup of coffee is really high. If I'm using a critical application, my willingness for failure is very low. So I need companies that have the resources to build towers, hire guys in hardhats, pole and light dark fiber. We need -- we actually need participation from the telecommunications companies to really build it out.

And I think that the sign that this is an actual critical area is, as you mentioned, they're changing their plans. I depend on those companies to want my money. The fact that I literally cannot pay for an unlimited plan without throttling on major carriers means that they're running out of room to absorb me because it's not about how big my wallet is. I can't actually get to yes.

Now, I've never run into companies. Companies never want to say no to more money and so the fact remains that the changes in their plans shows that the critical shortage is real, especially in some of the urban centers. Now, there are lots of other parts to debate, but I think we need more spectrum and we need it now.

MR. WEST: Okay.

MR. REED: And we'll work around it from there.

MR. WEST: Okay. What about the risk management and insurance

aspect, the second part -- the first part of her question?

MR. REED: It sounds like a Julie question.

MR. LABRIQUE: Yeah.

MR. WEST: Yeah, Julie.

MS. KING: Yeah. Yeah, I'm not sure I can really answer that question today for you. I think there -- we do need to take that into consideration. What is the risk? What's the risk for providers not having that information? If it is expected. I think that those are all things that have to be considered as we evaluate the impact of mobile health. It's the accessibility of that information and its impact on the healthcare delivery.

MR. WEST: The one aspect that I'll just add to that is mHealth can leave more of a paper trail, like especially when you're talking about remote monitoring technologies and feeding that information electronically to healthcare providers.

You know, from a risk management standpoint on the part of physicians, I think there's an interesting question from an insurance standpoint of what it means for them, like if there's this flood of data coming in and let's say there's a problem and they happen to miss because there's a bunch of information coming in, what impact is there going to be on their personal liability for having missed that.

MS. KING: Right. And I think it's that constant accessibility of information. At what point do they get information that they feel uncomfortable then responding to? Some doctors are getting information from social media, from their patients who are sending things through Facebook, that is PHI to that doctors' office.

So I think we need to be really contentious of PHI and where that information really lies and how would we expect or what would we do for providers to

have that information 24/7, you know, what's the expectation there? That's a challenge for providers and I'd probably talk to the docs here about how they would feel about having information that while they were sleeping that may have had some impact.

MR. WEST: Well, Doctor Alain has volunteered to answer this question.

MR. LABRIQUE: But we do have a mantra that we always use; that more data isn't necessarily better data. And I think earlier we were talking about this problem that mobile technologies in particular, and these devices with their no longer streaming, but rivers of information that are shooting at us, is what's commonly known as the big data problem. And I think that's front of research and innovation that we're starting to see a lot of progress in.

Trying to help us as mere humans decipher signal from noise in these rivers of information that are starting to come at -- into these electronic medical records and from these devices. You know, being able to monitor a patient's heart rate and EKG performance over the course of an entire day may or may not have clinical value. But I think it's answering those questions, which we still don't have definitive answers to that still needs a lot of research, as your question earlier pointed out.

I think we need to understand how can we really redefine what meaningful use really means; the new meaning for meaningful use and that is how do we extract the maximum amount of information, valuable information from the stream of data that we're now subjected to.

MR. WEST: Okay. Stephanie has another question from our webcast audience.

SPEAKER: I have two questions. The first question is directed at Doctor

Marttos and it is how widespread is the implication of mHealth solutions at present. And then -- and that question, I'm sorry, was from Alicia, who is a healthcare professional in D.C. And the second question is from Dan Lewis, who is an IT professional in Philadelphia, and he wants to know is there -- is the funding there to support sustainable mHealth, especially in developing nations.

MR. WEST: Okay. Antonio, do you want to take the first question on how widespread --

MR. MARTTOS: Yeah. The United States have some states that they have different networks, more developed networks. I know Florida has one, California, and Arizona, and others are starting to develop these networks. And again, other networks, they should follow the same regulations, HIPPA, the HIPPA regulations. All of the data and all data should have been (inaudible 00:53:01) the same level of security that they have at banks, et cetera, et cetera.

And I believe that we are just starting to move forward to more broad networks, et cetera, et cetera. You have a lot of networks in stroke, you have a lot of networks in trauma, and what's really growing right now is the homecare monitoring for patients to be proactive to prevent these patients to go to the ER, to try to access information -- before the patient has a problem. So it's really growing and it's growing fast at this moment.

MR. WEST: And what about funding sustainability in the developing world and the second question?

MR. LABRIQUE: Well that's a -- that's a big area of research and I think an investigation right now. What's beyond CSR? Corporate social responsibility and

their investment and in terms of a benevolent support of mHealth in the global space can only go so far. So coming up with effective and long lasting business models is one of the big challenges of sustaining mHealth.

But I think fundamentally, the solution will lie in reducing costs. So when we can demonstrate that the implementation of mHealth strategies reduces health system operational costs, but also costs of long term care for a chronic disease that's now not just a high income country problem, but a global health problem, I think, you know, we're going to start seeing the equation balance on both sides.

But the other part of the innovation in the business model space is thinking about those new opportunities that I had mentioned earlier, where, for example, one of the most exciting domains of intersection is that of mFinance and mHealth. In some countries like Kenya, mobile transactions, banking transactions make up a lion's share of the money that's exchanged commercially between individuals in that country. And so if you start to integrate financial transactions as part of the global healthcare system, I think you unlock a whole series of new opportunities to improve the way public health is delivered at the grassroots level in these remote rural populations.

MR. WEST: Okay. We have another question right here on the aisle.

MS. POPLIN: Hi, I'm Doctor Caroline Poplin. I'm a primary care physician. First, a shout out to Doctor Labrique about saying that EHRs can be helpful or very unhelpful depending on how they're constructed.

Second, your question about physicians getting information 24/7, that makes us very, some of us at least, very uncomfortable. Hospitals have lost lawsuits because the person in the ICU is on a continuous heart monitor that no one is watching

and it flat lines and the patient dies. If you are supposed to be -- if you are getting it, you are supposed to be watching it.

My question is about interoperability. We have hundreds of EHR systems and say your helicopter coming in with a trauma patient, maybe it's not going to go to your hospital, maybe it's going to go to the hospital across the city with a different EHR and a different system. Does the helicopter have to have all 10 systems, one for each hospital, so that they can communicate?

MR. REED: So I think we all know the difficulties with some of the siloing that's happening and the HIE issues and where we'll get with stage two and whether or not we'll get the interoperability that we're supposed to get out of EHR. I think that there is no question.

I'm always concerned though, where we drive clinical care based on avoidance of liability rather than what's in the best interest of the patient. So the thought of I don't want this data because it may expose me to liability is a reality, but I also know that I want the developer community to be working on solutions that enhance lives and enhance your chance of providing the right treatment for the patient.

So this is going to be a battle. I don't expect it to be solved overnight, but I hate the fact that in a lot of the discussions I have, and I think this is clear, that privately, folks lead with, okay, so what are my HIPPA risks, rather than does this solution actually help a patient. And I think that that's a really dangerous aspect of what we've gotten into, but I think we all know that that's the reality.

So my hope is we will have a lot of policy fights about this issue and I'm hoping that we can find solutions that help you in the primary care space to not have to

say no to well formulated data and a good EHR. As far as the siloing issue, we all know that theoretically that's supposed to, you know, when we get to stage three we should be solving some of these problems. Well, stage -- when put -- when we get through with all of the EHR records, when we get through doing that conversion we're supposed to move for more integration. I think that's a stay tuned and I think that's going to be a major issue for all of us; how do we deal with the siloing.

MR. MARTTOS: Yeah, I would say regarding information -- so we try to work in the same network. When it's not creating solutions so an EMR -- they can run on top of the regular EMR, then can interact to anyone. And again, I think mobile health is going to be part of a new status for healthcare (inaudible 00:58:31) they had a huge problem four years ago.

They had like 10 big hospitals receive all of the patients; the ERs were just full of people. They need to create a solution where they build 50 clinics with containers, like this kind of solution where they have the internal medicine, pediatrician, or -- and taking care of these patients and (inaudible) and mobile environment, EMR, et cetera.

And right now, only one percent of these patients go to the big hospitals. And they had, in four years, 10 million patients going into these places. So again, mHealth is going to be part of policies, strategies, for big states to help to manage information, the flow of patients, and to help to manage -- to deliver better care; keeping in the places that need to have the sick patients available to receive the sick patients and the other place to do prevention and to do the triage of these patients.

MR. WEST: Alain.

MR. LABRIQUE: So I think along some of the global space, especially in the lower income countries, we have an opportunity, as some of our mHealth colleagues have said in the past, to learn from the mistakes of the highly developed countries, such as the U.S.

And I think the government of Uganda, a little over two months ago, led by example by issuing a cease and desist letter across the country saying as of this moment, all electronic health and mobile health deployments have to be cleared by the Ministry of Health to ensure that interoperability is being considered, to ensure that the deployment is within the national strategy framework, and a number of other guidelines.

But as a move to try to create some homogeneity, some discourse, across the hundreds of pilot projects that were proliferating across the country. So there's an opportunity and there's an active dialogue being had in many of these locations about planning for the infrastructure, making sure that there are interoperability guidelines, and a common data backbone into which all of these different innovative deployments can feed. And so I think there's an opportunity and there's also a potential to learn from what may have not been done in the most optimal way in this country.

MR. WEST: Right here in the front we have a question.

MS. HOLEN: Thank you. I'm Arlene Holen, Technology Policy Institute. I have a question, in particular for Julie King. In terms of Humana's business model over the next 10 years or so, do you see a huge cost savings perhaps in mobile applications substituting for residential nursing home care? Those are huge potential savings. On the other hand, as you say, you can -- we could be improving health if people take their medicines and control their diabetes.

On the other hand, some of the applications could simply increase costs and that's perhaps why insurance companies are reluctant to cover them. It means the patient might want to ask the doctor all kinds of questions all day and night and simply -- that simply can't be handled. So do you see, in the next 10 years or so, major results in terms of cost savings, medical care quality enhancement, or how do you see this field developing?

MS. KING: I think -- I anticipate that there will be an improvement in healthcare quality, as well as healthcare access due to this use of technology. That's what I anticipate. That -- I don't see it being an alternate to home care. It may be an adjunct to it; it may be a part of the entire care management approach. And you know, I think it's really a matter of time to find out, you know, are -- is some of the biometric monitoring devices, whether it's on the go or in the home going to make a difference day to day.

I think really, Humana is here to help the wellbeing of our members and we want to find out what it is that really works. We anticipate it will have some impact on cost. We think that we are already having an impact on quality of care and access to care. And I think when we think not only about what's happening in other countries, what we think about the rural areas around our country, this is just another way for people to get access.

We have companies like WellPoint who are doing -- testing out models where a nurse is talking to a patient over the phone using the mobile phone and video conferencing. So I think there's all sorts of different opportunities. Is it going to replace? I'm not really sure. Is it going to be an adjunct to our healthcare? I absolutely think that it

has a lot of that potential.

MR. WEST: Alain.

MR. LABRIQUE: So I think another exciting domain to where this is going to lead us is a shift, and this is my public health hat speaking, but a shift from responsive care to preventive care. And as we -- we still haven't even tapped the potential intersection between social media and mobile health, where you look at kids these days, and I think fit bit is a great example.

You can put out your daily performance statistics on the web for your buddies and friends to respond to. And you can compete -- kids can compete with each other to see who's had the most exercise that day, who's gotten their heart rates up the highest for certain things.

So there's a lot of social media health movements that are out there, a number of websites encouraging kids to compete with one another to be healthy. So I think, you know, as we move forward into this space, really trying to capture the potential for improving preventive care is a huge untapped source of revenue savings in the long term.

MR. WEST: Okay. We have question right here.

MS. HOSEA: Thank you. I'm Christie Hosea from Booz Allen Hamilton and that's a beautiful segue to the question I was going to ask. I think that the acquisition tools and the forum factors are really terrific and are going to make a tremendous impact on health overall. But to the point of getting kids engaged and others, I think still a big issue is behavioral change. So for kids, it's easy to get them engaged in the fun aspect. I wouldn't say easy because it's not.

But for adults that might just say, you know, I'm getting all of my data, you know, and it's going directly to my physician and my physician can still have a conversation, but how do you get it so it's so seamless that you don't have to input the data yourself or that you don't have to keep monitoring.

We all know, weight loss, you know, if you record a journal, if you enter your information your impact will improve. But I still think that there's a gap and that humans, quite frankly, are too lazy or they just won't do that.

MR. REED: Well, that's my job. I mean in a nut shell that's the job of our industry. But that's also why things like your phone, which this is kind of a frightening study, but realize that most people are never less -- are never more than four feet away from their phone. That includes the bathroom; wow.

So when you talk about it, the ability to attach something like a fit bit that has a sensor and then Bluetooth's to your phone, I don't want to use up the -- I don't want to use up the actual spectrum for something like that. I think that you will have that change.

You know, Tony and I were talking about earlier about this cultural shift and unfortunately for our primary care physician who spoke earlier about the concerns with the HR, I think this is going to be a lumpy period for them adapting to these -- but the next generation of physicians are going to treat it as, well of course I view these records this way. And the 20 somethings will say, well of course my phone has this capability.

So I think there is going to be some difficulty, but as far as dealing with the laziness, well you know, technology is pretty good at helping people be more lazy. And I mean that in both a good and a bad way. So you're right. We can attach a monitor

to you, you can have your phone with you, it can have sensors on it, you don't have to actually manually enter it in.

People now have technology that allows you to take a picture of the food you're eating and do a guesstimate of calories. You know, you put in what it was and it does -- it analyzes portion. So we're moving in that direction, increasing laziness, but I think overall, I mean that in a good way, you know, the stuff you don't want to do.

But I think overall, a little hyperbolic, but we keep talking about this mobile as though it's something different and worried about the efficacy. Well, did the phone, the physical phone in your house actually improve healthcare? Well, probably. Did the car improve healthcare versus the horse and buggy?

I mean this mobile is a larger technology shift that isn't just happening within health. Mobile is happening within every aspects of people's lives. Walk down the street and look at how many people you see doing this. Look at how many people you shake your fist at in the car because they're texting while driving. So this is -- this is much larger than just the healthcare aspect.

Yes, that's $2.7 trillion dollars of our economy, but it's happening everywhere. So we're not going to carry a medical device with us, we're going to carry our phone or some other sensor capable technology that's going to give us a lot of other rich environmental things that we like in our lives. Oh, and it happens to have some health implications.

MR. WEST: And there are some cities that are starting to fine people for texting while walking. So, Antonio.

MR. MARTTOS: So how many people here in this audience needs

(inaudible 01:08:48) to check cholesterol, needs something to take care of their health -- their health? How many?

MR. REED: Hopefully all of you; come on.

MR. MARTTOS: Twenty percent. So that's a problem because most of the people that don't think about -- they're going to be sick. They don't think they can have a car crash or can have a problem until they have. So the (inaudible 01:09:08) population are going to be thinking about this is really small right now. That's why we need to improve our awareness. We need to say the prevention is important. I was in Italy last year.

There are huge discussions over there because Italy's (inaudible 01:09:20) Mediterranean food, right, healthy food. But they said that the level of people having heart attacks and problems, strokes, in Italy is increasing, the same level, the same speed as the fast food chains are increasing in Italy.

So we need to make people aware that they need to do something different to take care of their families for them -- right now have a research of while driving a car, there's one of the car companies, they have a car, you have eight hours per day you are collecting data with vests. We are starting to see if we can prevent people from sleeping and have an alert, people having arrhythmia, people have low glucose. You have one kind of data of data.

Just to see how your car can help you in the future to prevent certain problems; so this is coming. But again, you need to be aware. You need to tell each other that how to take care of your health is important.

MR. WEST: Okay. There's a gentleman right there who has a question.

MR. COOPER: Jeffrey Cooper. What is the business model that you see supporting mobile health?

MR. WEST: Julie.

MS. KING: Yeah; really it's about healthcare efficiency and effectiveness. That's really the bottom line. If it improves the health of an individual, prevents that hospitalization or ER visit, or if it does it in a less costly way, that's really where the costs are associated with it.

Now is there a business model for every organization that's represented within an organization? I'm not really sure. I think it's going to -- each one of those products and services need to really show its value. For example, some -- there are technologies to be able to measure your temperature by looking in the mirror or your pulse by looking in the mirror, or by you know, using your telephone.

Now, as a clinician, and I am a nurse as well, as a clinician, is that going to change your approach to how you provide care? I don't think so. And is it really less costly to, you know, check your pulse yourself or check your temperature.

So it's really about finding those technologies that have an impact on chronic illness or really work on those prevention kind of things. For example, there is an accelerometer on our iPhones that can be used, by turning it on, that can be used to measure without really another device associated with it. So can that be used as kind of that simple way of gathering information about how much you're moving, can you use that to communicate with your friends, compete with your friends, can we reward people for that, and then help to ultimately improve the health of that individual with their family and friends and doctor? So I think there is value in those relationships that we build

because that's what phones really bring to us. They are very personal. It's about your personal relationships. It's around your friends and family, not just your provider. Using all of those kinds of techniques, of rewards, and games, and also those relationships that kind of -- crowd sourcing; what can we learn from each other? Using location based services is also really critical.

There are all kinds of capabilities that we need to evaluate and utilize. If we're going to the grocery store, if I know going down this aisle there is food that is healthier for me than others, can I as a health plan or as a provider encourage you to pick up some of those healthy foods and give you a coupon for it or reward you for picking up the apple instead of, you know, something that's processed.

Those are all things we need to really think about, is there is so much value in that technology that we haven't yet tapped into, but ultimately we have to find the efficiency and effectiveness of the healthcare. Keeping people healthy and keeping them out of the hospital.

MR. WEST: I'm sure there's --

MR. REED: We need to write a business plan up on that one.

MR. WEST: -- a potato chip app out there some place.

MS. KING: Try it.

MR. WEST: But --

MR. REED: But I mean just to finish, I'd say that the easy way to look at the business models are back to what I started in the beginning. There's three different things we're working on. You're either going to be in the business of collecting information, you're going to be in the business of displaying information, or you're going

to be in the business of managing information that's collected and displayed.

So the business models aren't that different. We keep talking about it like it's, you know, this young up and comer, but I mean serious players are in this base, Microsoft, it's a real industry and there are real products backing it up. So you can come to the mHealth summit, NIH's -- now, the HIMSS mHealth summit in December and you can see there's a lot of business models going on there.

But to Julie's point, some of them will fail I promise you, including some of our members, which will make me sad, but it's the reality.

MR. WEST: But you have 6,000 so.

MR. REED: Yeah, I know. But I want 6,001, you know.

MR. WEST: Alain.

MR. LABRIQUE: I think on the global stage, manufacturers of phones have realized that the profit doesn't lie in the device. There are devices now, Nokia, and Motorola, Samsung, are selling devices for basically pennies. You can buy a feature phone in Bangladesh for 10, $20, and that's a marked up market price.

So you know, we've been talking about ideas such as a pregnancy phone. Why can't we give every pregnant woman a phone that connects her to a care provider during her pregnancy in rural Zambia or Uganda?

And you know, the business models that would support that are either investments that are currently being put into other care delivery systems that NGO support, but if you think about, what was -- what part of the mobile market segment accounted for over $280 million last year? It was ringtones.

Ringtones; ringtones, which have almost a zero cost investment, but a

massive return are one of the most popular investments that people make in South Asia and Sub-Saharan Africa. So you know, the profit derivations from the technology will come from other sources. I think giving phones to individuals may be something that we see happen in the very near future.

MR. WEST: Antonio.

MR. MARTTOS: Yeah, I think that the question is the (inaudible 01:16:13). So as soon as we recognize the ones -- the solution that has the value, we'll have more people using. Having more people using the costs of these are going to decrease. The cost and decreasing will be more accessible for everybody and then the insurance companies, they're going to adopt because if they don't have what the competition has, they're going to be at a disadvantage, right.

So the good ones are going -- the good solutions are going to survive, and again, are going to be more accessible for everybody, like -- when -- have a good quantity. Right now having a few users, they are going to be expensive, but now have everybody develop that, they're going to be really -- they're going to be really -- in the future.

MR. WEST: Okay. Over there next to the window there's a question. If we can get a microphone over to him.

SPEAKER: Hi, Ken (off mic) we work with lower income populations, which is where I -- my question stems. I guess my fear is that the mobile health innovations will prove to wealthier populations, as opposed to being developed for low income people and accruing good benefits towards that.

The example that you -- regarding text messaging, we did a similar

study. The Qualcomm, the benefits, were obvious and immediate in terms of health control and management of care along that. It seems to me that as somebody comes into a hospital or a care facility, equipping them with a mobile device and equipping them with the opportunity, just as you would have done with pregnant women, is a great way to help bring down healthcare costs and people coming back into the hospital and seems like healthcare companies should be getting -- or the insurance company should be getting declined, something like that, across the board. And this is just one example. I just wonder, you know, where you go on that and (inaudible 01:18:10) business model question.

MS. KING: All right. Yeah, I think when you look at low income populations the mobile usage is higher there than any others and text messaging is an incredible way to communicate with that population. And so the opportunities are vast and we see Medicaid programs that are in place, we see text for baby programs that have made a big difference.

There are a lot of programs in place that are low cost, that have a very positive impact on that population, and I would absolutely encourage us to look at all of those options, in particular for those that are low income or are often unserved or under served. It's a great way to provide that kind of support where they may not get that kind of regular care or regular kind of communication and texting can absolutely be a great solution for that population.

MR. WEST: Okay. Right here on the aisle we have another question.

MR. VERSEL: I think, back to the business model question, I think the question that is on everybody's mind is not where do we find the value in this but who

pays for it. I mean you can give phones to people but who's doing the giving, you know, direct to consumer hasn't really worked in healthcare except in some small populations. But I'm Neil Versel, Journalist from -- representing Mobi Health News today.

Direct to consumer hasn't really worked except among, you know, small populations of people with chronic, you know, with chronic diseases or perhaps the worried well. Actually, the real money is in patients with chronic diseases, not the fitness freaks that are, you know, buying fit bits and that sort of thing. So the question is really who pays for it, not you know, where are we going to find the value.

MR. WEST: Okay. Who pays?

MR. REED: Yeah, I think that's always not the $2.7 trillion question right now, 18 percent of America's GDP. I think we're all working on those solutions. As long as the products that we're doing are efficacious and actually improve either wellness or physician ease of access, I think we'll find folks to pay. That's going to take some time as we work with Medicare, Medicaid, various government agencies, figuring out how it fits on the schedule. I mean that's -- unfortunately that's where I have to put on my armor and do battle on behalf of the mobile apps folks to try to reach those solutions.

But the good news is I don't stand alone. You know, Humana is sitting here -- they actually have a pretty cool app that they've already pushed out. I'm finding that my allies are the folks who also want to see decreases in those things because it helps their bottom line too. So we definitely have some work that we have to do, especially with agencies that set prices, but the mobile apps folks aren't standing entirely alone.

MR. WEST: Julie, you won the best medical app last year. What was

the app?

MS. KING: It was really our administrative app. It's the utility that I talked about before; having any kind of information you need at your fingertips, your provider search, drug pricing, medication adherence reminders, reminders for refills and your id card. It's the kind of information that our members have actually asked for. It's free of charge to our members.

And even those without Humana insurance can use the provider search capability on their mobile website. And so it's really -- Humana has innovated and said, you know, we are committed to the mobile health space, it's a part of our entire digital strategy, we want to assure that our members have access to healthcare and that they're helping to manage -- that we're helping them to manage their own health.

We have an interest in lowering the cost of healthcare. We have an interest in keeping people healthy, in giving them the tools they need to manage their health, and if we can find ways to accomplish that through mobile technology or other technology, we're going to be the first in line to provide those services.

MR. WEST: Okay. We have time for one more question so we'll take it right here on the aisle.

SPEAKER: Thank you.

MR. WEST: So it has to be a really, really good question.

MS. KING: The pressure is on.

MR. WEST: Not to pressure you.

SPEAKER: (off mic) service innovation firm, Peer Insight, here in Washington, D.C. In terms of this cultural transformation, what is conceivable or

achievable of what's in the next five years?

MR. WEST: Hey, great closing question. I like that one.

MR. REED: I thought you said an easy, short question.

MR. WEST: Okay.

MR. REED: Everybody is looking at me. I guess the reality is is that expect to underestimate the speed at which things move. Some of you have probably read Cursewiler's stuff about, you know, the fact that by 2030 we're going to have a technology of your iPhone in the size of a red blood cell. I -- back in 20 -- in 2000, I remember somebody asking me what was the most innovative thing I saw in 2000 and I said the internet; not the internet itself, but the speed at which people had inculcated the internet into their lives.

I think there will be some lumps for physicians as we move forward, but I think don't underestimate the speed at which technology gets absorbed into the population. Just look at the explosion of -- look at Apple; 1998, the company was, you know, almost gone and now it's the largest capitalized company in the United States. So I think it's impossible to predict, but predict fast.

MR. WEST: Antonio.

MR. MARTTOS: Yeah, I would say that the sky is the limit, right. So I wish to finish my presentation by saying every human being has the right to have access to the best medical care available in the world, anywhere, any time.

And I really think that all of these tools, all of these management tools, EHRs, EMRs, all of these device can help that so I think in five years you're going to have more examples, more resolutions, more validations that all of this new technology

are going to really help to provide better care at any moment in the young population, the elderly population, and at home, in the hospitals, et cetera.

So I really think that in five minutes, a lot is going to change and it's like the cell phone. Cell phones, the internet, and mobile health are going to be a part of every day of our lives, every minute of our lives.

MR. WEST: Julie, what should we expect in the next five years?

MS. KING: That's such a -- the reason it's a tough question is because I started working in mobile health two and a half years ago and with the concept of what I could do to help promote health and healthcare access and not knowing where we were going to be today, just two and a half years ago.

We should expect a lot. We should expect that the industry will mature significantly and that new technologies will be in place that might make it look like what we're doing is old right now.

So it really is -- so there is so much unknown and I think we should expect more social connection, more crowd sourcing, more location based expertise, more context to where you are and what you're doing. And it might feel a bit big brother-ish, whether it's to the providers or to the member. I mean there are some things we really need to get through, in terms of privacy, in terms of regulations, but we should benefit from all of the capabilities that having technology at your side brings to the table.

MR. WEST: Alain, what's your five year vision?

MR. LABRIQUE: So 12 years ago when we started working in our Northern Bangladesh research site, we were seriously contemplating investing in carrier pigeons to communicate a 20 kilometer distance between two offices. We could not

make a landline phone call. Now, in 2012, all 850 of our field staff who are eighth grade level village women have their own phones.

So that's in a nutshell what we've seen in a decade of transformative change in rural populations. But I think we continue to see that kind of transformation on a yearly basis across the developing world. And so I think what we're going to see is more connectedness to information, connectedness to services, but also the ability now to count individuals and that's critical. To be able to know who and when women and children are dying so that we can save lives and I think that's really the goal that we have for this technology.

MR. WEST: So we've gone from carrier pigeons to mobile devices in 12 years. When we look ahead to the next 5, 10, and 12 years, it'll be amazing what we'll see. So I want to thank Alain, Julie, Antonio, and Morgan for sharing your views with us. We'll be doing our next mobile economy project event in the fall, so we encourage you to check our website for updates on the project. Thank you very much.

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