

**OVERCOMING RURAL HEALTH CARE
BARRIERS: USE OF INNOVATIVE WIRELESS
HEALTH TECHNOLOGY SOLUTIONS**

HEARING
BEFORE THE
SUBCOMMITTEE ON HEALTH
OF THE
COMMITTEE ON VETERANS' AFFAIRS
U.S. HOUSE OF REPRESENTATIVES
ONE HUNDRED ELEVENTH CONGRESS
SECOND SESSION

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**OVERCOMING RURAL HEALTH CARE
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THURSDAY, JUNE 24, 2010

U.S. HOUSE OF REPRESENTATIVES,
COMMITTEE ON VETERANS' AFFAIRS,
SUBCOMMITTEE ON HEALTH,
Washington, DC.

The Subcommittee met, pursuant to notice, at 10:05 a.m., in Room 334, Cannon House Office Building, Hon. Michael H. Michaud [Chairman of the Subcommittee] presiding.

Present: Representatives Michaud, Snyder, Donnelly, McNerney, Perriello, and Bilirakis.

Also Present: Representative Miller of Florida.

OPENING STATEMENT OF CHAIRMAN MICHAUD

Mr. MICHAUD. I would like to call the Subcommittee to order, and ask the first panel to come forward. I want to thank everyone for coming here this morning.

The purpose of today's hearing is to learn about the wide range of innovative wireless health technology solutions and their potential application to help our veterans living in rural communities.

Of the nearly 8 million veterans who are enrolled in the U.S. Department of Veterans Affairs (VA) health care system, about 3 million are from rural areas. This means that rural veterans make up about 40 percent of all enrolled veterans. For the 3 million veterans living in rural areas, access to health care remains a key barrier as they simply live too far away from the nearest VA medical facility. Unfortunately, this means that rural veterans cannot see a doctor or a health care case worker to receive the care they need when they need it. Given these barriers, it is no surprise that our rural veterans have worse health care outcomes compared to the general population.

This is where I see the great potential in the innovative wireless health technologies. VA certainly is a recognized leader in using electronic health records (EHRs), telehealth, and telemedicine. However, wireless health technology also includes mobile health, which truly is the new frontier in health innovation. Mobile health makes it possible for health care professionals to receive real-time data such as vital signs, glucose levels, and medication compliance because data from the patient's mobile sensors are relayed over wireless connections. Mobile health also makes it possible for health care professionals to download health data using personal

digital assistants (PDAs) and Smartphones. These innovations not only empower our rural veterans but can improve health care outcomes as veterans have the necessary tools to better manage chronic diseases and receive timely health care in the comfort of their own homes.

I look forward to hearing from our witnesses today as we learn more about innovative wireless health technology and explore ways that we can best support wireless health solutions in the VA systems.

I would now like to recognize Mr. Bilirakis for an opening statement.

[The prepared statement of Chairman Michaud appears on p. 40.]

OPENING STATEMENT OF HON. GUS M. BILIRAKIS

Mr. BILIRAKIS. Thank you, Mr. Chairman. I appreciate it very much. And good morning to everyone, all of our witnesses and audience members. I am excited to be here with you today to discuss wireless health technology within the VA, particularly how it can be utilized to increase access to care and improve patient outcomes for veterans in hard-to-reach rural areas.

Approximately 40 percent of the veteran population resides in rural areas, and those numbers are expected to increase as veterans of Iraq and Afghanistan return to their rural homes. Living in a hard-to-reach area presents numerous barriers to care for veterans, who must often drive long distances and find overnight accommodations to make appointments at distant VA facilities. These factors would be significant for anyone but are especially burdensome to veterans who struggle with pain, disability, or chronic illness.

I am proud of the work we have done on this Subcommittee to help ease the burden rural veterans face, but, as always, more work remains. The VA currently operates the largest telehealth program in the world, operating in 144 VA medical centers and 350 VA Community-Based Outpatient Clinics. Estimates indicate that 263,000 veterans were cared for using VA's telehealth initiatives in fiscal year 2009 alone.

Telehealth is the provision of health care services through telecommunications technologies, including cell phones, Smartphones, the Internet, and other networks. When a patient receives a text message reminder from their doctor, they are engaging in telehealth. When a doctor is able to monitor an at-risk patient's blood pressure or heart rate through a remote monitoring device, they are engaging in telehealth. When a specialist at a VA medical center is able to communicate with and make a vital diagnosis on a veteran patient at a Community-Based Outpatient Clinic many miles away, they are engaging in telehealth.

Early results indicate that when wireless technology is utilized effectively it can be a tremendous benefit, especially for rural veterans. From these programs we are learning that when technology is incorporated into health care it can improve access, efficiency, innovation, and outcome, while reducing barriers to care.

While such technology is not without its challenges, I am encouraged by the early successes of VA's telehealth programs, and I look forward to learning more from our discussions this morning.

I yield back the balance of my time. Thank you, Mr. Chairman.

[The prepared statement of Congressman Bilirakis appears on p. 40.]

Mr. MICHAUD. Thank you, Mr. Bilirakis.

We have many expert witnesses with us today; and with such full panels we need to make sure that there is adequate time for questions. We have also been notified that there will be votes between 11:00 and 12:00 over in the House Chamber.

So I would like to remind each witness that you will have 5 minutes to make your remarks. On the table, there is a timer; and the yellow light will indicate there is about 1 minute left.

Also, your full written testimony will be submitted for the record.

So, without any further ado, I would like to introduce our first panel: Dr. Joe Smith, who is the Chief Medical and Science Officer at West Wireless Health Institute in California; Darrell West, who is Vice President and Director of Governance Studies and Director, Center for Technology Innovation, Brookings Institution; and David Cattell-Gordon, who is the Director of Rural Health Network Development, Co-director of The Health Appalachia Institute, and Faculty of Public Health Sciences, Nursing, University of Virginia (UVa) Health System in Virginia.

So I want to welcome our three panelists on the first panel and I look forward to your testimony.

We will start off with Dr. Smith.

STATEMENTS OF JOSEPH M. SMITH, M.D., PH.D., CHIEF MEDICAL AND SCIENCE OFFICER, WEST WIRELESS HEALTH INSTITUTE, LA JOLLA, CA; DARRELL M. WEST, PH.D., VICE PRESIDENT AND DIRECTOR OF GOVERNANCE STUDIES, AND DIRECTOR, CENTER FOR TECHNOLOGY INNOVATION, BROOKINGS INSTITUTION; AND DAVID CATTELL-GORDON, M.DIV., MSW, DIRECTOR, RURAL NETWORK DEVELOPMENT, CO-DIRECTOR, THE HEALTHY APPALACHIA INSTITUTE, AND FACULTY, PUBLIC HEALTH SCIENCES, NURSING, UNIVERSITY OF VIRGINIA HEALTH SYSTEM, CHARLOTTESVILLE, VA

STATEMENT OF JOSEPH M. SMITH, M.D., PH.D.

Dr. SMITH. Thank you very much.

I would like to first thank Chairman Michaud and Ranking Member Brown for the opportunity to testify today on meeting the needs of our veterans, particularly those who live in rural areas.

My name is Dr. Joseph Smith. I am the Chief Medical and Chief Science Officer of the West Wireless Health Institute. Our institute is a nonprofit medical research organization launched last year by two visionary entrepreneurs, Gary and Mary West, with the primary mission of lowering health care costs through the use of wireless health solutions.

The Wests, through their family foundation, have already granted nearly \$100 million to this institute to date; and we are focusing those resources to innovate and incubate promising technologies, validate their ability to lower aggregate health care costs, and en-

gage, as we are today, with policymakers and other stakeholders to accelerate the availability of these solutions.

Wireless sensors that aid in remote diagnosis, monitoring, and treatment support are among the innovations that will enable the institute's mission. In general, wireless sensors deployed in, on, or near the body can accurately monitor physiologic functions, including body temperature, respiration, heart rate, physical activity, blood glucose levels, tissue oxygenation, relative hydration, among many.

Because of their pervasiveness and low cost, cell phones and other wireless technologies are well suited to cheaply analyze, transmit, and display relevant information and help patients' families and health providers manage chronic disease. In this way, wireless technology can offer continuous care for chronic disease, instead of the snapshot of a patient's condition routinely available at a clinician's office and, in the process, replace expensive episodic rescue with cost-effective prediction and prevention.

Wireless health care enables a new infrastructure independent model in health care, which translates into the right care at the right time whenever people need it. For veterans residing in remote areas, this means avoiding the burden of time and expense required to make repeated visits to distant facilities.

We believe the VA system has provided early validation of the value of these promising technologies. Specifically, we commend the VA for its Care Coordination/Home Telehealth (CCHT) program, which has demonstrated a 25 percent reduction in bed days of care, including a 50 percent reduction for patients in highly rural areas, and a 19 percent reduction in hospital admissions by simply taking chronically ill veterans and linking them with health care providers and care managers through videoconferencing, messaging, biometric devices, and other telemonitoring equipment.

Dr. Darkins, the lead architect of this study, is on the panel to follow. And building on his success, we encourage the VA to evaluate and implement wireless health solutions beyond traditional telehealth that will complement and further extend the reach of the CCHT program, including wireless biometric centers that monitor disease-specific physiologic parameters and track disease activity on a continuous basis. These technologies enable patients, providers, and family members to monitor the metrics of their conditions without a facility inpatient visit.

Relevant to this opportunity is the recent announcement of the new \$80 million VA Innovation Initiative (VAi2) meant to improve veterans' care by tapping into private-sector expertise and creativity. We encourage VAi2 to accelerate the development and evaluation of more sophisticated wireless health care solutions comprised of advanced sensor technology, patient and population based learning algorithms, and remotely titrated therapies for a wide range of health care needs.

The VA's early success in the use of health technology rests, in part, with the physician's ability to operate across State lines. For typical U.S. clinicians, geographic limitations of practice create a serious impediment to the wide deployment of wireless health solutions and frustrates the ability of our broader health care systems from reaping the cost and care efficiencies enabled by these solu-

tions. We encourage a thoughtful review at the Federal level to address the interstate obstacle to widespread adoption of wireless health technology.

Also imperative to extending veterans' access to wireless health technology is the rapid expansion of broadband to rural and remote areas. The Federal Communications Commission (FCC) has noted that as many as 24 million Americans do not have access to broadband where they live. We commend the commitment to expanding broadband access in the 2009 economic stimulus bill, and we support the FCC's plan to ask the Medicare program for a clear path for reimbursement for wireless health solutions.

Finally, in our many stakeholder discussions it is clear that that current lack of regulatory clarity as to which components of wireless health solutions are and are not considered medical devices from the Food and Drug Administration (FDA) perspective is dampening investment in wireless health technology and chilling this promising engine of innovation.

In summary, we encourage the VA to evaluate and deploy newer wireless health technologies within its CCHT program and take advantage of opportunities like the recently announced VAi2 initiative to develop and test biometric sensors and other solutions that facilitate remote use and remote access to care. We encourage Members of the Committee and Congress to support broadband expansion, as well as a clear and consistent regulatory and reimbursement environment to spur the types of innovation that will truly enable care anywhere, any time.

Following the VA's lead, Congress should consider policies that facilitate health care delivery across State lines with the expansion of State-to-State reciprocity agreements being one potential first step.

Thank you again for the opportunity to testify here today. I am reminded that it was 100 years ago that Abraham Flexner wrote what is thought to be one of the most impactful treatises on American health care and in that he called out that our Nation's smallest towns deserve the best and not the least adequate physicians. I think we can't wait another 100 years for that to take place and that wireless solutions will enable the best thinking and the best minds to be present in rural areas where our veterans live.

Thank you.

[The prepared statement of Dr. Smith appears on p. 41.]

Mr. MICHAUD. Thank you very much, Dr. Smith; and I couldn't agree more with that last statement.

Dr. West.

STATEMENT OF DARRELL M. WEST, PH.D.

Dr. WEST. Chairman Michaud, Ranking Member Brown, and the other Members of the Subcommittee, I am Darrell West. I am Vice President and Director of Governance Studies and also Director of the Center for Technology Innovation at the Brookings Institution.

The United States has more than 23 million men and women who serve proudly in our military; and I think all of us would agree that, in response to their valuable service, providing quality and accessible health care is a major national priority. But yet we all recognize that that task has gotten much more difficult due to our

Nation's \$13 trillion national debt and the \$1.4 trillion budgetary deficit that we face. I think this is especially the case for rural veterans who live great distances from medical facilities and often have had difficulty getting access to quality care. So for these and other individuals, I suggest that wireless health technologies represent a key ingredient in providing quality and accessible care, while also gaining budgetary efficiency in the process.

I am going to suggest today that health care based on mobile health, remote monitor devices, electronic medical records (EMRs), social networking sites, videoconferencing, and Internet-based record keeping can make a positive difference for many people. So let me just briefly talk about each of those aspects.

Today, there are almost as many mobile phones in existence that can browse the Internet and access e-mail as there are personal computers. Right now, there are an estimated 600 million mobile phones, compared to 800 million personal computers.

The fact that so much of our country, including veterans, has moved towards mobile devices gives us the opportunity to introduce new technologies for medical care. There are a number of new remote monitoring devices for various health care conditions that offer the virtue of putting patients in charge of their own test keeping and monitoring their own vital signs; and this will help keep them out of physicians' offices, at least for routine things.

In the case of diabetes, you know, it is crucial that patients monitor their blood glucose levels. In the old days, they would have to physically go to a doctor's office or a lab to undertake those tests. Today, we have monitoring devices at home that can record their glucose levels instantaneously and electronically send them to health care providers.

My colleague, Bob Litan, at Brookings undertook a research project a couple of years ago on remote monitoring devices; and he estimated that we would be able to save \$197 billion over the next 25 years if we move towards these types of monitoring devices. So that would certainly represent a big advance.

Another big problem in medical care is people forgetting to take their prescription drugs. There have been studies estimating that half of patients do not take their drugs either at the right time or in the right dosage. And so there are simple e-mail techniques or phone reminders that can tell people when and where they should be taking the medication. You know, if half the people are not taking their medication at the right time, that is an enormous source of waste right there. So technology can help be part of that solution through e-mail, automated phone calls, or text messages.

Mobile phones have gotten much smarter. There are many interesting new applications that allow physicians to get test results on their mobile devices. They can look at blood pressure records and chat them over time. They can see electrocardiograms. They can monitor fetal heart rates at a distance.

So, again, for rural veterans, both men and women, these types of applications overcome the limitations of geography, help save money, while also providing better access to care. If veterans need a second opinion on a condition, those types of future help enable that.

There are social networking sites that offer great potential for improving care by allowing veterans to share information about chronic conditions that they are suffering, both in terms of the symptoms they are experiencing as well as the treatment effects that they are experiencing.

So I think in a lot of different ways technology is a major plus for us. What we need to do is make greater use of mobile health in rural areas. We need to focus on positive health outcomes. We need to reward good behavior by physicians and patients. And, if we do that, I think we can save money while also leading healthier lives.

A lot of people want to say if we are cutting costs that automatically is going to cut quality. That is not necessarily the case. In other segments of American society we have seen cost efficiencies that also produce better service and better care.

Thank you very much.

[The prepared statement of Dr. West appears on p. 44.]

Mr. MICHAUD. Thank you.

Mr. Cattell-Gordon?

STATEMENT OF DAVID CATTELL-GORDON, M.DIV., MSW

Mr. CATTELL-GORDON. Mr. Chairman, good morning, distinguished Members of the Subcommittee. I am David Cattell-Gordon and serve as the Director of Rural Network Development, the Manager of Telemedicine and a Faculty Member in Nursing and Public Health Sciences at the University of Virginia. I also serve as the Co-Director of the Healthy Appalachia Institute, a Public Health Institute that serves the citizens of Central Appalachia.

As the son of a distinguished World War II—rural World War II veteran from the Iron Men of Metz and as a child of the coalfields myself and as a health care professional that serves many rural patients and communities, I am honored to be here this morning to provide testimony on how we can utilize innovative technologies to overcome barriers to health care in rural areas.

As a part of the University of Virginia's pioneering program in telemedicine, I have become convinced that telehealth and wireless capabilities can improve health outcomes, decrease isolation, reduce health disparities and, as you have heard, substantially reduce costs, a vital issue for our over 3 million rural veterans.

Everyone on the Committee, I am sure, is aware of the award-winning show and book, *Band of Brothers*. What you probably don't know, as a Committee, is that one of its most famous members of Easy Company, Darrell Shifty Powers, came from Dickinson County in remote Virginia. Shifty, a Bronze Star recipient, went back home after the war to serve as a machinist for the Clinchfield Coal Company. Sadly, Shifty died last year of cancer on June 17.

With his diagnosis of cancer, Shifty depended upon the VA and our systems of care, but the winding roads and the steep mountain ridges of Appalachia created huge barriers, as access to cancer care was literally hours away.

So the evidence is overwhelming, in individuals and in large studies, that veterans who live in rural settings have lower health quality, they have increased co-morbidities, and reduced access to specialty services.

Importantly, telehealth technologies, as this Subcommittee well knows, can reduce and overcome these barriers. The integration of telehealth into rural communities, including and importantly health information exchange through electronic medical records between the VA and rural health programs, has implications for the delivery of vital services for all rural people.

Sound policies must facilitate ubiquitous and affordable access to broadband infrastructure to support the delivery of these services. While we have advanced, Congress still needs to continue to drive broadband enhancement into rural areas and the application of telehealth in these environments by continuing Federal funding of demonstration projects, reducing statutory and regulatory barriers to telehealth, especially in Medicare, aligning—and this is critically important—Federal definitions of rurality, ongoing support of the Universal Services Fund, improved interagency collaboration around telehealth, encouraging the use of and reimbursement for store and forward telemedicine, and ensuring health information exchange.

While the expansion of broadband is the context for removing these barriers, perhaps the most innovative process is what these gentlemen have talked about this morning, wireless communications. The cell phone, taken with digital networks and remote monitoring capabilities, represents a critical turning point in health care. They have already proven to reduce isolation, provide a vehicle for public and personal health messaging, supporting monitoring chronic diseases, and on and on. We now need to consider bandwidth and wireless access as a prescribable medicine for the health of our rural communities.

I want to thank this Subcommittee for your work, the Veterans Affairs Committee, as well as Congress, for the steps that have already been taken to enable this environment. But I also challenge you and challenge Congress that we need to engender an environment of investment by continuing to fund demonstration projects, ensuring health systems are incentivized to use wireless configurations, a standards-based environment for usage and, critically, doing what we can to ensure a Nation of seamless coverage without network fragmentation.

It has been stated that genetics and the tools of molecular medicine will provide a new era of health care. While that is most certainly true, I contend that it is wireless devices, telehealth applications, and Internet-based health software that are precipitating the most important opportunities for improved health care for all veterans and for our rural communities.

Thank you very much.

[The prepared statement of Mr. Cattell-Gordon appears on p. 50.]

Mr. MICHAUD. Thank you very much, all three of you, for your testimony.

I have a quick question, for all three of you. From your testimony I assume that all three of you, believe that there is a great opportunity for the VA to move forward with these wireless health solutions. So my question is, what steps should the VA, FCC, and FDA take to clear the way for this new technology? We will start with Dr. Smith. Keeping in mind that some States, like Maine, are very

rural, and they might not have the broadband that we need for this type of technology. So we'll start with Dr. Smith.

Dr. SMITH. So I think it starts with assuring the wireless infrastructure is present. I think to the extent that we can avoid the health care delivery system being centered in hospitals and clinics and move it to being centered in patients' homes where they can be appropriately monitored with relatively low sophistication devices and that information be liberated from their homes and their bedsides to caregivers, independent of their location, I think that is critical.

I think to achieve the great value that you speak of and the opportunity that is in front of us, we have to make sure that the regulatory and reimbursement path for the innovators who are on the front door making these things is quite clear to them; and at the moment it is clearly not clear. At the moment, there is great concern that aspects of the system, including the handsets, you know, the wireless handsets or, in fact, even the telecommunications companies can be part of an FDA-regulated concept of a medical device, or that they can be the target for the plaintiff's bar in the event of some untoward event, and that those concerns are chilling the engine of innovation that could deliver the technologies that matter so much.

And then I think, lastly, we need to incentivize the appropriate use of this technology once it is available. And that is not so simple as to say they are available. It is to provide the financial incentives for appropriate use. Because I think, as the VA program has demonstrated, there is dramatic cost savings and quality improvement and satisfaction of the patients waiting. And they are waiting. And what we need to do is make sure that we incentivize the use.

You know, the Institute of Medicine has told us that it can take 16 years from the time novel technology has proven to be useful to the time it is fully adopted, and patients are waiting.

Dr. WEST. Mr. Chairman, I would like to address the Food and Drug Administration part of your question. Because I think, in general, the VA has made tremendous progress on incorporating new technology. There is still work to be done, but they are ahead of many other parts of society.

But the FDA, I think, has a problem in the sense that the policy and regulatory regime is way behind the technology. The FDA plays a role in certifying new devices that come on the market; and I think especially the pace of technology innovation has been very intense and very rapid in recent years, the remote monitoring devices that I have been talking about, some of the new apps that have been developed for Smartphones. The FDA needs to revamp its regulatory review process to speed up the approval of these new innovations, because there are tremendous new devices that are coming on to the market, but it has been a slow process to get approval of many of those things.

So if there is one specific thing that I would recommend it would be taking a close look at the FDA and encouraging it to do all that it can to speed up its certification and review process.

Mr. CATTELL-GORDON. I would very much agree with the points that my colleagues have made concerning this and further say that

the VA is the leader. You guys wear that mantle of leadership in the Nation, and you need now because now is the time.

I think for us to continue to debate this subject as to whether or not this is an effective capability, we are way beyond that. The data is overwhelming. Whether you look at what we do with traumatic brain injury and reminders for appointments, whether we look at how we monitor a veteran with diabetes to lower that A1C and prevent blindness and follow their care, or whether it's a weight loss program, the evidence is overwhelming.

So we know that that is true. So now it is about adoption, and we have to push that across the government at a lot of levels, whether it is the definitions of rurality, whether it is encouraging and incentivizing investment by health systems to use this. Rural veterans use a variety of health systems, so we have to integrate that. We have to integrate their VA records into rural health care. There are a lot of things we need to do, and I would just encourage that the most important thing we can do is act now.

Mr. MICHAUD. Thank you.

Mr. Bilirakis.

Mr. BILIRAKIS. Thank you Mr. Chairman. Appreciate it very much.

For the whole panel, what lessons do you think the private sector can learn from VA's telehealth model of care and how can it be incorporated into private-sector telehealth solutions?

Again, for the entire panel.

Dr. SMITH. I think the VA has effectively demonstrated that there are dramatic cost savings to be had while you get simultaneous improved satisfaction and improved outcomes. I think that that lesson is hard to learn in other more siloed health care systems, because the systems are not so well constructed that you can determine whether investments in one location result in cost savings in another. And so, because it is an encapsulated or closed system, they have been able to collect the data and demonstrate that; and I think that, by itself, is remarkable and it should impel further investment.

But I do go back to the issue that, while the data is quite clear and the facts data analysis align, that there is a great improvement to be made, that there are hurdles, and those hurdles need to be addressed.

I also mention the notion that practice across State lines is something that the VA is able to achieve that the private sector is not yet able to achieve, and I think there is an opportunity there as well.

But the specific answer to your question, what did the private sector learn? I think they learned that this approach clearly works in improving outcome, improving patient satisfaction, and lowering costs; and that is a huge lesson.

Dr. WEST. The big problem I see in the private sector is just the fragmentation and the organizational disunity that exists, just because we have a system where there are lots of different providers, lots of different services that are offered, and we have huge problems in terms of connectivity and integration. And so I think the lesson that the private sector can learn from the VA is just if you

have a unified organizational structure it really makes a huge difference in terms of technology innovation.

The big problem of technology innovation today is really not technology. It is organizational. The technologies are out there. We are seeing lots of innovation. The problem is the integration and the connectivity. And so I think the most important lesson that we can learn from the VA is when you solve some of those organizational problems the innovation, through technology, gets a lot easier.

Mr. CATTELL-GORDON. I am very proud to say that, under the very able leadership of Dr. Karen Rheuban and the Office of Telemedicine at the University of Virginia, last year, mandated coverage for telehealth services for the citizens of the Commonwealth. That is landmark. We are all very proud of it; and it is going to change the health care environment for all citizens, including rural citizens.

And if there is any lesson it comes out of the data from the VA was an essential part of the arguments for why we need to move forward. So going back to your respective home communities and ensuring at the level of the States coverage for telehealth services, based on the data, is going to be the most critical thing to engender an atmosphere where we are successful.

Mr. BILIRAKIS. Thank you.

Another question for the entire panel. Given that the group of individuals who would arguably benefit the most from wireless health solutions are the elderly and the ill, how should we overcome their lack of familiarity and trust regarding modern technology in order to better implement these tools?

Dr. SMITH. I think there are already approaches that are proving successful there. I think we have seen in our own community—again sponsored by the West family—senior centers where we bring high school and college students in to run Internet cafes, where you can take seniors who are really unfamiliar and perhaps even ill poised to use wireless technologies and the Internet and introduce that to them in a fashion which is very unthreatening by much younger people who have grown up with this as really in their water. And so I think there are opportunities that are going to be unique to every location.

But I am not a fan of the notion of throwing up our hands and saying that, you know, it is really not their era. They can't get it. That is just—that is false and defeatist. I think we can—you know, we are a country of innovators and educators as well, and so I think we can handle that problem. And the youngest among us is really terrific at these technologies, and putting those people together in the same room has proven very effective in our own community.

Mr. BILIRAKIS. Thank you.

Dr. WEST. Congressman, you are exactly right. There is a huge generation gap in the use of technology, and so it is a problem that we need to confront.

I mean, I grew up in a rural area. My father was a farmer. And I remember years ago the Agricultural Extension Service was created as a means to extend innovation in the agricultural area, and I think that is a useful model to think about in the health care area as well.

It doesn't have to be government run. I mean, there are volunteer organizations. There are nonprofits that are essentially taking on the training mission to kind of go into senior citizens centers to basically sit down with the elderly on a person-by-person basis and just show them the neat things that are out there. I mean, a lot of people, when they just see what you can do with it, it becomes a very easy sell. The problem is kind of getting over that initial hurdle of just showing them how you can do that.

So I think, you know, AmeriCorps could play a role. There are nonprofits that are active, but I think we need to kind of take the training mission very seriously in order to deal with the problem of the elderly.

Mr. BILIRAKIS. I agree. Thank you.

Mr. CATTELL-GORDON. I have to confess. I am still having a great deal of difficulty having my 91-year old mother to get her to use Skype, but I really want to Skype her. And, you know, for all of us and for all of us who are getting ready to move into retirement, and I hope very soon, these tools are going to be critically important. For the monitoring of our health, our connection to our families, Skype has been an incredible tool.

We all have to acknowledge we have some ways to go. But I would point to the program of all-encompassing care for the elderly in Big Stone Gap. It is a Centers for Medicare and Medicaid Services (CMS) pro-capitated program, very efficient care down there in Big Stone Gap; and we use telehealth connectivity to reach those seniors with dermatologic care, endocrine care, psychiatric care. And they are used to watching TV. They are comfortable in the environment. They are using the tool, and it is demonstrated by the show rate for care. The show rate, we are demonstrating, can be higher, for instance, in telepsychiatry services than the person-to-person care. So while we still have a long way to go, we have made great strides, and I think it will apply across the generations.

Mr. BILIRAKIS. Thank you.

Thank you, Mr. Chairman. Appreciate it. I yield back.

Mr. MICHAUD. Thank you.

Mr. McNerney.

Mr. MCNERNEY. Thank you, Mr. Chairman.

Dr. Smith, you cited reductions in hospital stays for vets that use wireless health services. Could you expand that a little bit by giving us sort of a typical example?

And, also, what is the sort of basis of that percentage you gave? What was the universe that you were looking at at that point?

Dr. SMITH. So, to be clear, I won't steal Adam Darkins' thunder on too much of this, but it is—a prototypical example could be that a patient is discharged from the hospital after being hospitalized for congestive heart failure (CHF); and that is a complex, very common, and very expensive disease. But if left to their own devices, no pun intended, that disease is such that recurrent hospitalization is the norm. If one intervenes intermittently or nearly continuously daily with knowing and messaging back and forth about weight and blood pressure and medication reminders, one can greatly assuage the likelihood of those subsequent rehospitalizations; and the cost of those daily modest course corrections is trivial compared to

the expense and complexity of a repeat hospitalization for heart failure.

And that is just one particular chronic disease example. There are many that fall in that same line.

Mr. MCNERNEY. Okay. What was the basis of that percentage reduction? What was your sample? Was it a veterans—a group of veterans?

Dr. SMITH. So that study, again, Adam Darkins' study, is 43,000 patients over a 5-year period of their publication in 2008. So that is not an anecdote. That is the best we have.

Mr. MCNERNEY. Okay. Thank you.

Mr. Cattell-Gordon—or Doctor—is it your sense that the lack of broadband expansion is limiting our rural veterans as well as the problems in rural areas receiving cell phone services?

Mr. CATTELL-GORDON. Absolutely.

Interestingly, I was just in Tanzania on a cervical screening project, a country of 38 million people, size of Texas, 20 million people with cell phones. Everywhere I went, everywhere I went, ubiquitous cell phone coverage used for all kinds of transactions. I don't have the luxury of that in Southwest Virginia, and I want to. My beautiful iPhone, a tool I use most frequently as a paperweight. I want to see that change.

And we were talking earlier—Dr. West and I were talking earlier we can't have a perfect environment. There will often be regions where we are not going to solve this, but let's shoot for good. Let's really redouble our efforts to ensure more seamless coverage, because that is going to be the critical thing then to use the tool for the very kind of project that has been described.

Mr. MCNERNEY. Okay. So that gives us just a little bit more incentive for the sake of the veterans to move forward with broadband access.

Mr. CATTELL-GORDON. Correct. Absolutely right. And as we think about guys and women coming back from Afghanistan and Iraq, they are coming back with their Smartphones. Let's remember that.

Mr. MCNERNEY. Dr. West, I was kind of encouraged by something you said. Part of the problem with medication compliance is the human error. Seniors are people that are a little bit less connected, tend to fall behind and not follow the regimen properly. You indicated that, using cellular or broadband, you can give the people the proper reminders so that they can keep up with their regimen and have better outcomes. So I am really glad that you mentioned that. I was going to sort of question you about that if you hadn't.

The one thing that is missing here is we see there is a great opportunity for cost reduction here. But what about the cost of implementing this kind of a program? I haven't heard or seen much in terms of how long it will take in your estimate or how much this is going to cost as opposed to the savings that we might expect later on.

Dr. WEST. I mean, that is a very interesting and important question. And it often has been true that to invest in technology takes up-front money, and then the cost savings unfold over a period of

time. So you really have to have a longer time horizon to see the benefits.

But when you look, for example, at the private sector where they have achieved great efficiencies and have enhanced productivity, generally they introduce new technology while also thinking about organizational changes that result from the improved worker productivity. And so to kind of just introduce technology and expect cost savings in isolation from organizational change is not a strategy that I would recommend.

I think if you really want to achieve the budget efficiencies that you need to kind of introduce the technology, start to redefine worker roles. There can be a flattening of organizations that allow for cost savings. I mean, those are the things that I think produce more substantial cost savings over a period of time.

Mr. MCNERNEY. Thank you, Mr. Chairman.

Mr. MICHAUD. Thank you.

Mr. Miller.

Mr. MILLER. I have no questions.

Mr. MICHAUD. Mr. Perriello.

Mr. PERRIELLO. Thank you, Chairman.

First, let me just say how proud we are, Dr. Cattell-Gordon, to have you at the University of Virginia and all of the amazing work you do for our veterans and in our rural communities; and it really has been amazing to see, both in the VA system and beyond. I was out at the community health center in Nelson County, as you know, looking at the telemedicine work, the number of specialists that can now treat people in rural communities without leaving University of Virginia Hospital. And particularly to note, as you did, that we are actually seeing increases in mental health visits in the telemedicine context, which I think was a surprise to many of us. But I think it is both a comfort level issue and simply an access issue. So we are very excited about that.

And to echo Mr. McNerney, I think we sometimes talk about broadband being a barrier, but you and I drive a lot of roads where we are still talking about cell phone coverage and not even broadband.

And, also, just thank you for your work in Tanzania. I think you were with Peyton Taylor on that trip as well, who I ran into the other day. It is just amazing what you all were able to do using very old school tactics of working through some of the community leaders, and some of the technology is incredible.

Following up on all that we are very proud of in the area, one of the things that I just wanted to ask you about—you didn't touch on as much today but I know you have looked at—is issues of suicide and drug addiction concerns, particularly in Appalachia and some of the rural communities.

To what extent does the telemedicine and some of the technology run the risk that we are not seeing some of the signs or screenings from people being physically present? Or is this an opportunity because we are going to be able to monitor things? What kind of dynamic do you see between the technology and that particular problem?

Mr. CATTELL-GORDON. I am very proud of the fact that we have a psychiatrist at the University of Virginia, Dr. Larry Merkle, who

has done extensive review of rural issues and suicide. The numbers are overwhelming. You look at the Virginia Department of Health, you look at rural areas in particular, you look at the coalfields of Virginia, the suicide rate is twice that of what it is in the State as a whole.

And then you look at issues like fatal unintentional overdoses from addiction to pain medications. The mortality rate in the coalfields of Virginia is 40 deaths per 100,000, adjusted, as opposed to 8.3 deaths for the rest of the State. These are huge problems. The level of disability, the lack of access to care, the isolation that people experience in rural areas create a perfect storm of problems for mental health issues.

Then you add to that the absence of practitioners. There are just way too few practitioners, and there are going to be even greater shortages in primary care and mental health folks for these regions for our vets and for everyone else.

So telehealth and the use of wireless capabilities become a key tool to reduce isolation, to send reminders, just the appointment reminders alone—and this has been a VA study—to look at folks with traumatic brain injury, and reminders over the cell phone for their appointments and daily contact has dramatically changed the number of people who show for their appointments.

Those small things will add up to the large indicators about the way we can address mental health issues in rural areas.

Mr. PERRIELLO. Just one other question, which is, obviously, there is a lot of great stuff going on at UVa and at other teaching hospitals around the country. To what extent are we doing a good job of creating a partnership between the VA system and some of our research facilities and teaching hospitals? Are there barriers that exist for sharing the kind of research that you are talking about and making sure that is feeding into the VA system with rural and telemedicine and more broadly?

Mr. CATTELL-GORDON. We are very proud in Virginia and we would really like to hold it up as a model for the way the VA interacts with Federally qualified community health centers (FQHCs), that network. As we look at health care reform, the investment that we are making as a Nation in the FQHCs is enormous. And they are going to be a critical resource, and they are more and more coming into line as telehealth facilities. And then they integrate to the veterans' facilities that then integrate to the academic teaching facilities in Richmond and in Charlottesville and at EDMS in the eastern part of Virginia. These networks are going to ensure our success.

We have a NASCAR word for it in Virginia called "coopertition" and that is what we need to see in these networks, a commitment for an interrelated telehealth network. And whatever disease group you look at, whether it is mental health issues, whether it is cancer, whether it is heart disease, those networks are going to be essential for the success of our communities.

Mr. PERRIELLO. Well, thank you again for all you do.

And certainly the CHCs have been tremendous as a primary care delivery tool you know, it is the first interface for so much of central and southern Virginia, and they are going to end up in the UVa emergency room one way or the other otherwise. So I think

not only do we see the cost savings we have talked about in the VA system, but I think even beyond that where we are getting that telemedicine care. So I appreciate all the groundbreaking work you all have done and will continue to learn from that.

Thank you very much.

Mr. MICHAUD. Mr. Donnelly.

Mr. DONNELLY. Thank you Mr. Chairman.

Following up on my colleague's question, with the different organizations that are involved in telehealth now, is there plans or is there a way to have a clearinghouse where best practices, in effect, are put down, so that what road maps you may have been able to achieve in Virginia can then be used in another State without having to try to reinvent the wheel?

Mr. CATTELL-GORDON. One of those tools, Health Resources and Services Administration (HRSA), has had investments through their office for the advancement of telehealth to create across the Nation, and in particular for rural regions, telehealth resource centers. And those telehealth resource centers become absolutely a vital resource in sharing best practice models.

Let me give you an example, Arkansas. Arkansas does a fabulous job with reducing infant mortality by providing high-risk obstetrical care through their telehealth network. They have shown a 26 percent decrease in infant mortality in Arkansas because of this program. It has been a huge success.

And those best practices then get shared through these telehealth resource centers, along with the tools people need, the sort of ways to set up evaluative process, the ways to finance, sharing information on how to seek Federal and local fundings, ways to incentivize programs, curriculum for health care professionals, and how to use telehealth. So those telehealth resource centers that are funded through the Federal Government I really want to support and urge Congress to continue to support through HRSA funding.

Mr. DONNELLY. So when, as Ranking Member Bilirakis was discussing some of the elderly patients that may be involved probably have a long-term relationship with a primary care physician in the area. How is the primary care physician looped into the whole telehealth process?

Mr. CATTELL-GORDON. One of the important things about telehealth is that, as a principle, it is not designed to replace the fundamental importance of a good physician/patient relationship. I mean, that is a sacred part of medicine and one that has to continue to be reinforced.

What it is, is a tool in that primary care physician's doc kit. You know, it is like his or her stethoscope, and they need to see it as such, that the referral of that patient, when they need a dermatologist and there is no dermatologist within 4 hours, or it would take you 3½ months to get an appointment with a dermatologist for that elderly patient, that the use of telehealth becomes a critical tool for what that primary care physician can do.

Now, do we have a systematic way where we are educating primary care physicians in this? No, we don't. And it needs to be incorporated into medical education.

The role of nurses is going to be critical in the delivery of primary care in this Nation. I can't say enough about how important

it is for us to look at what the role of the nurse practitioner is going to be in our communities in delivering care.

And then using telehealth as a capability of providing access to specialty care. These are the things that we are going to be looking at over the next few years. And Congress has a critical role in continuing to serve as the leader through the VA system and how that is realized.

Mr. DONNELLY. Well, as Members who deal with veterans' issues as we all do, veterans' issues every day, we have such a concern for our rural Members who may not have the access to so many VA centers, so this telehealth is critically important. And whatever the veterans' network can do to be a good partner, please continue to let us know as time goes on. Chairman Michaud, Ranking Member Bilirakis I know are very in tune with this. And so we want to make sure that we are making the lives of our veterans easier and answering their health questions and letting them have peace of mind. So we appreciate you guys being here today. Thank you.

Thank you, Mr. Chairman.

Mr. MICHAUD. Thank you.

Mr. Snyder.

Mr. SNYDER. Thank you, Mr. Chairman. I am sorry I was late.

I am actually a former family doctor, but still from Arkansas, so I appreciate the Arkansas plug. But, also, my wife and I have three—18-month old triplets—boys, so we went through a lot of the high technology stuff recently. And, of course you start running into a little network of folks with multiples. And we were talking to the doctors, oh, yeah, we are following another case. It turned out it was in North Arkansas, but they are doing it by telemedicine. Is that the kind of program you are talking about, where they would go to their regular obstetrician (OB) perhaps up north but then they would have the specialist, the neonatal person online? Is that what you are talking about?

Mr. CATTELL-GORDON. That is exactly what I am talking about. It is called the Arkansas Angels program. And I would invite all the Members of the Committee, go out and Google them. They have just been highly successful in that, in women's health and in prevention and diabetes monitoring. It is an example, along with many other telehealth programs.

It is important to say that there is a telehealth program in every State in the United States. A lot of the infrastructure is there now to build out what has been an important point-to-point connection. Now we have the opportunity to move it from point to point to point to home to multiple points using wireless capability.

Mr. SNYDER. I wanted to ask a specific question that is not related just to veterans but to our whole country. One of the issues that has come up here through the years is the shortage of mental health practitioners, both urban and rural, but you certainly notice it in rural areas, and we have had some terrible tragedies of social workers or people that work for programs going out to follow up on a patient who has a major schizophrenic diagnosis or something and an act of violence occurs towards the follow-up.

Where do you see—I didn't see your written statements. What do you see is the possibility for the kinds of technology improvements

that you all are talking about with regard to helping people with devastating illnesses of schizophrenia, really the major psychoses?

Dr. SMITH. I can comment a little bit.

It is now quite clear that, for schizophrenia, the notion of medical compliance is critical and can have tragic discontinuities. After skipping a couple of days, attitudes about their medical therapy changes, and they can irrevocably walk away from therapy. And there are excellent innovative approaches for guaranteeing compliance with medical therapies to the extent that if you are ½ an hour late taking your medicine you can get an e-mail about it. If you are a little bit longer than that, you can get a phone call about it. And all of that can be enabled with nonparticipatory technologies, so that your pill cap may be able to be wirelessly connected to a care provider's office that lets them know that you haven't, in fact, opened your pill bottle today. And so that—I think it can start there.

And certainly there are connection paths between caregivers and patients that can be—through their cell phones or through the Internet that can be pleasant reminders and carry messages that can be engaging. And so that there is a greater sense of connectedness, and that can mean so much for those who are struggling with psychological illnesses.

Mr. SNYDER. How much limit do you see in the kind of things that you all are talking about on the issue we still have with low education levels and poor literacy rates? How much does that interfere with some of the things you all are talking about?

Mr. CATTELL-GORDON. I have spent most of my life working in the coalfields of Southwest Virginia; and we have lower educational attainment, limited income, lack of access to meaningful work, high rates of uninsurance, health factors, high cholesterol, obesity, smoking. You know, you bundle all those things up and the consequence—and this includes our veterans in the region—to premature mortality.

So, without being overly dramatic, these are life-and-death issues. And we can't talk about how we are going to change access to health care without talking about how we are improving education. And these same tools that we are talking about have to do with improving professional education, improving the skills of the workforce, improving a family's understanding of the disease, a chronic disease, so it is a tool that integrates education and health in the most powerful ways. And that is why I have become fully convinced that this is one of our most primary solutions to health issues in rural areas.

Mr. SNYDER. Thank you, Mr. Chairman.

Mr. MICHAUD. It is getting late. Thank you to all three of you for coming here this morning. You all provided very enlightening testimony. I know that I will be submitting other questions in writing, so hopefully you can get the answers quickly.

Once again, thank you very much. I appreciate it.

I would ask the second panel to come forward, and as they are coming forward I will introduce the second panel. We have Dr. Powell, who is the President and Chief Medical Officer and Co-Founder of AirStrip Technologies in Texas. We have Rick Cnossen, who is President and Chair of the Board of Directors of Continua

Health Alliance in Texas. We have Kent Dicks, who is the Chief Executive Officer (CEO), Chairman, and Founder of MedApps in Arizona. We have Dan Frank, who is the Managing Partner of Three Wire Systems, LLC, in Virginia, and he is also here on behalf of MHN; and we have John Mize, who is Director of LifeWatch Federal, LifeWatch Services in Illinois.

And I will turn it over to Mr. Miller to introduce one of his constituents.

Mr. MILLER. You turned it over to me because you couldn't pronounce his name.

Mr. MICHAUD. That is correct.

Mr. MILLER. Thank you very much, Mr. Chairman.

It is a pleasure for me to introduce to the Subcommittee today Dr. Huy Nguyen. He is a constituent of mine from Pensacola. He serves as CEO of Cogon Systems. Cogon is setting a higher standard in health information technology (IT), bringing forth expertise on a topic of great importance to the VA Committee, electronic record sharing. Cogon has already demonstrated success with the U.S. Department of Defense (DoD) at Naval Hospital Pensacola. They are currently evaluating their system and are currently sharing information with other local hospitals in the area.

As a Navy veteran in Iraq himself, he was well aware of the many needs and shortcomings of DoD and VA in their systems, and his knowledge will be valuable to this Committee as we keep seeking to improve services for our veterans.

By demonstrating that a virtual health network can exist and at the same time safeguard information, Cogon, under Dr. Nguyen's leadership, has taken a step where I and many other Members of Congress wish to see VA and DoD go. The electronic record formed during a soldier's service under DoD and immediately transitioned to VA upon separation from active duty is long overdue. Not only will it ensure easier enrollment into the VA health care system, it will also help bring a better quality of care when those soldiers do in fact enroll.

I thank him for his contributions to our active-duty military and veterans community; and I thank you, Mr. Chairman, for agreeing to have him here to share his insight with your Subcommittee.

Mr. MICHAUD. Thank you very much, Mr. Miller.

I will also remind this panel, because of votes that will be coming up, we will try to stick to the 5-minute rule.

We will start off with Dr. Powell.

STATEMENTS OF WILLIAM CAMERON POWELL, M.D., FACOG, PRESIDENT, CHIEF MEDICAL OFFICER AND CO-FOUNDER, AIRSTRIP TECHNOLOGIES, SAN ANTONIO, TX; RICK CROSSEN, PRESIDENT AND CHAIR, BOARD OF DIRECTORS, CONTINUA HEALTH ALLIANCE, AND DIRECTOR OF PERSONAL HEALTH ENABLING, INTEL CORPORATION DIGITAL HEALTH GROUP, HILLSBORO, OR; KENT E. DICKS, FOUNDER AND CHIEF EXECUTIVE OFFICER, MEDAPPS, INC., SCOTTSDALE, AZ; HUY NGUYEN, M.D., CHIEF EXECUTIVE OFFICER, COGON SYSTEMS, INC., PENSACOLA, FL; DAN FRANK, MANAGING PARTNER, THREE WIRE SYSTEMS, LLC, VIENNA, VA, ALSO ON BEHALF OF MHN, A HEALTH NET COMPANY, SAN RAFAEL, CA, ON THE VETADVISOR® SUPPORT PROGRAM; AND JOHN MIZE, DIRECTOR, LIFEWATCH FEDERAL, LIFEWATCH SERVICES, INC., ROSEMONT, IL

STATEMENT OF WILLIAM CAMERON POWELL, M.D., FACOG

Dr. POWELL. Thank you.

Good morning, Chairman Michaud, Ranking Member Brown, and distinguished Members of the House Committee on Veterans' Affairs. My name is Cameron Powell. I am actually a Obstetrics/Gynecologist physician by training and the co-founder of AirStrip Technologies.

We are a health care IT-based medical software development company based out of San Antonio, Texas; and our technology actually improves patient safety and reduces risk and improves access to care, specifically by delivering real-time critical patient data through the cell phone network and wireless networks to mobile devices such as the iPhone with a real focus on patient monitoring data such as wave form data.

Interestingly, this morning there has already been a lot of discussion about women's health and perinatal care, particularly referencing the triplets earlier and the Angel Network in Arkansas. Actually, our first product using our own technology that we developed, AirStrip OB, is one of the only FDA-cleared applications on these mobile devices, currently approaching about 200 hospital installations around the United States; and every day we have thousands of doctors relying on this real-time critical access to these babies' heart tracings to try and prevent adverse outcomes from occurring in obstetrics. And we just started in obstetrics. Soon we will be unveiling our critical care and cardiology applications.

But I think as we all know in the U.S. we have a lot of problems in our health care system, and one of the core problems that we are focused on that is facing health care professionals is this increasing disparity between a growing number of patients that need to be monitored in any environment and the relative decreasing number of doctors and nurses that can actually monitor them. So what we are all focused on right at the end of the day is trying to figure out how do we get in a timely fashion the right data about the right patient to the right doctor or nurse at the right time to try and effect a positive outcome. So remote patient monitoring of critical patient data using these devices—iPhone, Blackberry, Android, iPad—is rapidly becoming a necessary technology within the

health care IT space to try and better care for patients and improve outcomes, especially in rural communities.

I want to briefly talk about several reasons that patient monitoring with mobile devices is important and a few examples.

So, number one, doctors and nurses are a lot more mobile than we were 5, 10 years ago. We are covering multiple hospitals, we are covering multiple environments, and we know that patient access to care in remote areas continues to be a problem.

And with recent advancements in technology there has been a paradigm shift in the health care community. There is an expectation now that technologies will allow health care providers to have access to this type of data. So the type of data that we deliver, which is this real-time critical wave form data and other types of analytics and decision support data on demand, very fast, securely, in a Health Insurance Portability and Accountability Act (HIPAA)-compliant fashion onto a mobile device.

And if we think about this growing disparity, the number one cause in the United States of patient injury, at least in a hospital, is communication errors. And as you have a fear of physicians being able to take care of or required to take care of more patients, the probability that communication errors will grow is there. It is going to happen, and this shortage is not going to get better any time soon. So if you can, through wireless technologies, if you can close the communication gap and you can deliver that critical data on demand to a health care provider to help them make a better decision about a patient or what to do about a patient in a situation, then you have hopefully tried to reduce that risk.

So we are working to solve this problem by inventing this Air-Strip technology. And of course, we first went after the obstetrical market, but now our application is looking to apply across both women's health, all of inpatient monitoring, the intensive care unit, the operating room, the emergency room, but also into the home health space in rural communities.

Some of the technologies that we hear about here today are people that are either our partners or becoming our partners as we take that data that is being generated in the home or in the rural environment and display it very rapidly on the mobile device to help the physician and the health care providers make a difference.

And I want to speak a little bit about the type of data. You get numbers and vital signs. It is important. But there are specific types of data that require visual interpretation. We talked again earlier about obstetrics and a fetal heart trace. And the way we make decisions is based visually on how this data changes over time in real time and historically.

So if you are able to take that critical wave form data and provide it to a physician anytime, anywhere, we have hundreds and hundreds and hundreds of physician testimonials talking to us, telling us about how this has helped to avoid a bad outcome.

So I think we are in a very exciting place with our technology. We are considered agnostic to the market. So we are either partnered with or looking to partner with multiple patient monitoring companies, health information systems, EMR vendors, to effectively mobilize all of that data and at the end of the day try and improve outcomes by this type of compelling delivery system.

And I think my time is up.

[The prepared statement of Dr. Powell appears on p. 56.]

Mr. MICHAUD. Thank you very much.

Mr. Cnossen.

STATEMENT OF RICK CNOSSEN

Mr. CNOSSEN. Good morning, Chairman Michaud, distinguished Members of the House Committee on Veterans' Affairs.

My name is Rick Cnossen. I am the President of the Continua Health Alliance. On behalf of the members of the Alliance, it is my privilege to be here to testify in front of you on this very important issue.

The Continua Health Alliance is an international, open, nonprofit company. It has about 237 companies at this point, and we are striving to put together an ecosystem of interoperable standard-based personal health technologies like the ones you are hearing about. It is similar to the Wi-Fi Alliance and what they have done for the ubiquity of Wi-Fi. We are trying to do that for personal health solutions.

It is shown that standards-based solutions provide better quality, lower cost and higher innovation, and so that is what we are doing. We have been at it about 4 years, and we are making good traction. We have certified products from A&D, Cypar, Intel, Nonin, Omron, Panasonic, Roche, TI and Toshiba; and we have several mobile developments from the likes of Cambridge Consultants, MedApps, Qualcomm, and Vignet; and also IBM and Oracle are looking at how we can integrate into EHRs.

In Continua, we use the term called eCare, and I would like to define that for you. It is the class of health information technologies that can facilitate the kind of virtual visit or electronic connectivity outside of traditional office visits. This can include in-home or mobile broadband devices, secure text messaging or video teleconferencing.

There are four benefits of eCare I would like to point out, the first being tools and education. Like we heard in some of the earlier comments, eCare provides the opportunity to let people understand their disease better with education and also tools so that they can see the results of their lifestyle decisions. Hopefully those tools provide motivation so that they can keep taking their medication, and doing the things they are doing to make improvements.

The second one is collecting vital signs data dynamically. Instead of going to the doctor's office once every 6 months, to take a single blood pressure reading, we now have the opportunity to take it on a regular basis in order to provide a much richer compilation of data from which a doctor can make a diagnosis. Also, if something were to happen, we can detect that and take action on it immediately, not 6 months from now.

The third is to facilitate virtual visits between the provider and the patient so that we can utilize eCare when it is needed and where it is needed, particularly for veterans that might be in rural areas.

And the last one, we provide social support networking so we can extend the framework of care beyond just the hospital to include

friends and families where appropriate or people with the same type of disease that might be halfway across the world.

There is plenty of evidence about this. You have heard of some of them, New England Healthcare Institute (NEHI) and the VA. There are reports out that show great quality of care for a much lower cost. You can see why we are excited about eCare.

The Congress also recognized the value of eCare. In the health reform bill, they have about 20 different references to programs that include eCare. I will just list a few: the Accountable Care Organizations for Community-Based Collaborative Care Networks, the Independence at Home Demonstration Project, the Medicaid Health Home, and the CMS Innovation Center. All these include technologies that could be characterized as eCare.

In order for the veterans and their families to realize the benefits of eCare that we have been talking about, the Continua Health Alliance has the following—respectfully submits the following recommendations, five of them:

The first one, integrate eCare into CMS reimbursement policy. Right now, out of the \$468 billion budget, Medicare pays \$2 million for telehealth, or .00005 percent. We feel that if reimbursed procedures and services can be effectively offered with eCare, they should be reimbursed as well.

The second one, establish blueprints for the use of eCare in the States and in communities. One of the earlier questions talked about how we can leverage that. The VA has done a great job, and other places are doing good work. We do not want to reinvent the wheel but rather pull these blueprints together so that other communities can leverage it.

Third, establish a Federal regulation focused on eCare. There are many organizations involved in this, including the FDA, Office of the National Coordinator for Health Information, FCC; and we feel like there should be an organized approach such that it is proceeding in a coordinated, coupled fashion and we are learning from each other.

Fourth, incorporate eCare as part of Meaningful Use. With the health care reform bill and with the American Recovery and Reinvestment Act of 2009 (ARRA), certainly we are going to have EHRs out there becoming broadly adopted. eCare provides valuable data to populate those EHRs such that doctors can have rich information to draw on.

And, fifth, make broadband availability for all Americans a top priority. About 20 percent of Americans are not currently covered, including a lot of vets in rural areas. We can provide a much richer eCare experience with that.

In closing, we have a unique opportunity to change and extend care from the home and manage to improve care and options for our veterans in a cost-efficient manner. We must take action through vision, leadership, and a national commitment to prepare for the demographic and economic changes that will bring changes to health care. America can be the leader in this, and we can start with the VA. Please let us know how we can work with the Committee to make this possible.

Thank you.

[The prepared statement of Mr. Cnossen appears on p. 57.]

Mr. MICHAUD. Thank you very much.
Mr. Dicks.

STATEMENT OF KENT E. DICKS

Mr. DICKS. Good morning, Chairman Michaud, Ranking Member Bilirakis, and distinguished Members of the House Committee on Veterans' Affairs, Subcommittee on Health.

My name is Ken Dicks, Founder and CEO of MedApps, a small business enterprise located in Scottsdale, Arizona. On behalf of the team at MedApps and the veteran-owned enterprise that manufactures our devices here in America, I would like to thank you for the opportunity to present this testimony.

We are here today to speak about overcoming rural health care barriers through the use of innovative wireless health technology solutions. I am here today to talk about innovative digital wireless communications technologies, like those produced by my company MedApps, which are quickly becoming a key component in the delivery of health care in services across America via wireless remote patient monitoring.

Medical devices, health sensors, and their applications rely upon mobile broadband functionality and interoperability to transmit raw data, diagnostic health information, critical aspects of care, emergency services, and related health information. These services are at the forefront of a revolution in the provision and delivery of health care in America, a revolution which collapses time, space, and distance to more effectively monitor patients, develop analytic trends, maximize strained medical resources, and save lives.

First, a word on the nomenclature surrounding wireless health. There are many terms loosely used today to describe the different and often confusing aspects of wireless health information technology. For the purposes of today's hearing, I will use the term eCare, which is the term used by the Federal Communications Commission in Chapter 10 of the National Broadband Plan.

ECare is the electronic exchange of information, electronic data, images, and video to aid in the practice of medicine and health care analytics. ECare is not a substitute for health care providers, physicians or clinicians. It is intended to augment the good work of medical professionals.

In a landmark comprehensive pilot with 17,000 veterans, the Department of Veterans Affairs demonstrated that by implementing remote patient monitoring they experienced a reduction in hospitalizations by 25 percent, at an average cost of \$1,600 per patient per year for remote patient monitoring, compared to an annual cost of \$13,121 per patient for primary care and \$77,745 for a patient for nursing home care.

Amazingly, those encouraging results and statistics were achieved with the first generation of wired systems that are typically more costly, proprietary, and are tethered to a point of care, lacking mobility. If the pilot program was able to achieve those encouraging results for patients using that technology, imagine the potential wireless eCare technologies would hold.

ECare technologies, like wireless mobile solutions, drive down costs and improve care by closely monitoring patients wherever they may be. Thus, they allow health care to be practiced in a more

proactive manner, rather than a reactive manner, and can possibly head off a patient going to the emergency room or hospital setting in the first place.

In my hand up here is our HealthPAL. HealthPAL is a technology that the sole purpose is to allow a patient to stay connected with their electronic health record and ultimately their caregiver. The HealthPAL is FDA cleared and communicates wireless, or wired, with other medical devices, such as this Nonin Pulse Oximeter which takes your SpO2 and your heart rate as well. A doctor may ask a veteran with chronic obstructive pulmonary disease or congestive heart failure to take a reading once a day in order to make sure that they are staying within the safe zone.

The HealthPAL, like the one that I am holding in my hand, has mobile cellular technology, M2M technology like this, M2M technology I hold in my hand today. The 3G mobile broadband chipset by Qualcomm is about the size of a quarter, which is embedded in the HealthPAL, and is the key to connecting our veterans to their health care providers in an efficient and economical manner.

The HealthPAL works as an agnostic hub or central device that connects to various medical devices and sensors and then transmits their data to a secure central server. The HealthPAL comes packaged together, including mobile wireless connectivity straight out of the box, ready to use. Nothing complicated to set up, provide or maintain. Everything is done remotely, including software upgrades, like the popular Kindle model.

The MedApps solution is used in a variety of ways by everyday people including David Jesse, a truck driver from rural Ohio. David's erratic schedule makes it difficult to set up and keep appointments with his doctor, and his health suffered because of it. David often had to produce log books to take back to his doctor at the Cleveland Clinic every couple of months. His doctor attempted to adjust his medication based on the information. Today, David uses the HealthPAL in the cab of his semi truck and has taken his readings throughout 47 States.

The technology has allowed David to substantially improve his health and need for medication. He no longer has to drive back to Ohio every 2 months to be checked by a doctor, who, along with David's wife, can stay connected to him remotely on the road, making sure he is okay and his medical conditions stay under control.

At Meridian Health, a New Jersey health system, the technology is being used to help reduce readmissions of congestive heart failure patients. Typically across the country, 27 percent of congestive heart failure patients are admitted within 30 days with the same condition. An average CHF hospitalization is about \$8,000. At Meridian Health, the HealthPAL and a wireless scale are provided to a CHF patient upon discharge to monitor a patient every 30 days to ensure patients with signs of worsening conditions are seen by their physician for early, less resource-intensive intervention. The equipment is returned to Meridian at the end of the 30-day period. So far, 30 patients from Meridian have experienced no readmission due to heart failure within the 30-day period.

Thank you.

[The prepared statement of Mr. Dicks appears on p. 63.]

Mr. MICHAUD. Thank you.

Doctor Nguyen.

STATEMENT OF HUY NGUYEN, M.D.

Dr. NGUYEN. Chairman Michaud, Ranking Member Brown, and distinguished Members of the Subcommittee, thank you for the opportunity to testify today.

I also want to thank Representative Jeff Miller from my district for the introduction and to note that he has been a leader in advancing the use of health information technology for veterans.

My name is Dr. Huy Nguyen. I am a Navy veteran who served in Iraq in 2003 as a physician attached to the Fleet Hospital Pensacola. During that tumultuous period, I saw up close and personal the cost of war and the utmost sacrifices that our veterans make in the service of their country. I have since separated from active duty. However, I continue to serve our military and veteran community as a civilian emergency physician at Naval Hospital Pensacola.

In addition to my military affiliated duties, I am also the founder and CEO of Cogon Systems. Our mission at Cogon is to facilitate connected, value-driven health care. We achieve this by facilitating secure Web-based health information solutions leveraging cloud computing technology, which includes mobile technology.

In my written testimony, I discussed a variety of mobile health issues. However, in my oral presentation, I would like to focus particularly on how health information exchanges can complement mobile technology by allowing comprehensive health information to be accessible on mobile devices. Secure mobile access to comprehensive health information can be particularly helpful to providers and veteran patients in rural communities.

As context to today's testimony, I would like to highlight a significant Veterans Administration objective that guides Cogon's desire to facilitate better care for veterans and in the process be a beacon for the greater civilian health care community.

The Department of Defense Military Health System and Veterans Administration are promoting the Virtual Lifetime Electronic Record initiative, otherwise known as VLER, which represents a major iteration of a new national capability to securely share electronic health information via the nationwide health information network. This is important in light of the fact that three out of four veterans receive a portion of their care from civilian providers.

President Obama has also stated that it is important to, and I quote, allow health care providers access to servicemembers' and veterans' health records, in a secure and authorized way, regardless of whether that care is delivered in the private sector, Department of Defense, or VA.

The TRICARE Health Information Exchange project in Pensacola to facilitate the sharing of health information between military and civilian providers was a Congressionally funded project. The basis of Congressional support for this endeavor is due to the fact that, by some estimates, more than 60 percent of health care delivered to a DoD beneficiary is provided by private-sector health care providers.

Civilian providers are unable to access health information regarding a patient's status—health status or care from the MHS

electronic health records system today. Similarly, civilian medical records concerning military beneficiaries are not available to MHS providers. In essence, we are practicing medicine in an information vacuum. This is the reality of patient care in military communities today.

Our Congressional funding for this project is fiscally managed by MHS' Telemedicine and Advanced Technology Research Center. To date, the project has successfully tested and deployed the largest instance of health information exchange between Federal and civilian providers. The project entails sharing protected health information between Naval Hospital Pensacola and private-sector health care providers in Pensacola by interfacing Cogon's health information platform with the DoD/Veterans Administration Bi-Directional Health Information Exchange, otherwise known as BHIE. Though not perfect, BHIE is the current health information exchange between the MHS and VA, and it is the largest health information exchange in our country and represents a significant investment on the part of both agencies.

As far as I know, we are the only commercial entity that has been allowed to interoperate with the BHIE platform. So in Pensacola more than 30,000 records concerning patients jointly seen by the MHS and Pensacola civilian providers can now be shared. This data exchange is in compliance with the data use agreement between our company and the MHS TRICARE Management Activity Office. Furthermore, the Pensacola community is finalizing a Nationwide Health Information Network Data Use and Reciprocal Support Agreement as mandated to be part of any VLER demonstration.

The Florida Gulf Coast boasts a large contingency of active duty and veterans. Escambia County in Florida is also fortunate not only to have Naval Hospital Pensacola but also the Veterans Administration Joint Ambulatory Care Clinic. Both facilities are not only supportive of this health information exchange, they also play a significant role in the governance structure of the exchange.

Because of the significant presence of the Veterans Administration in the Pensacola community, we believe that it is important for the VA to consider establishing Pensacola as a VLER community. As health information becomes more interoperable, the potential for mobile health is limitless.

Again, as a physician and a veteran, I would like to thank this Subcommittee for allowing me the opportunity to testify on a subject that is personally dear to me, the care of veterans.

I hope that in my written and oral testimony I have established three things: One, the sharing of health information between MHS, the VA, and civilian providers as envisioned by the VLER initiative is important to coordinated care for our veterans. Two, this ambition to share information can be securely done today, as shown in Pensacola as we migrate toward a nationwide network. Three, a health information platform and exchange can augment mobile technology in striving to serve isolated rural communities.

The VA, in conjunction with the MHS, has enormous opportunity and responsibility to maximize its leadership in health information in order to take care of veterans.

Thank you very much.

[The prepared statement of Dr. Nguyen appears on p. 65.]
Mr. MICHAUD. Thank you.
Mr. Frank.

STATEMENT OF DAN FRANK

Mr. FRANK. Mr. Chairman and distinguished Members of the Subcommittee, thank you for the opportunity to testify on the use of wireless technology to overcome rural health barriers.

My name is Dan Frank. I am the Managing Partner of Three Wire Systems, LLC, a service-disabled, veteran-owned small business. I am joined by my colleague, Dr. Ian Schaeffer, the Chief Medical Officer of MHN, a Health Net Behavioral Health Company.

We are here today to talk about VetAdvisor, an innovative evidence-based program that provides mental health outreach screening and health coaching services to Operation Enduring Freedom/Operation Iraqi Freedom veterans and their families in both urban and rural areas. VetAdvisor is a program which augments and supports existing VA behavioral health care services and assists veterans with challenges they face during reintegration into civilian life. It uses traditional and nontraditional telehealth delivery platforms to reach out to veterans and to improve their awareness of and access to mental health support for issues such as tobacco cessation, weight management, or understanding post-traumatic stress disorder management.

VetAdvisor assists veterans and their families, providing nonclinical health coaching services via telehealth platforms, which allow veterans to focus on areas of concern to them without leaving their homes. The program identifies and works with veterans who have or are at risk for post-traumatic stress disorder, depression, substance abuse, suicide, and homelessness. This telehealth approach to outreach screening and coaching helps eliminate the stigma veterans often associate with seeking mental health services and assists them in getting treatment.

Health coaching services are provided to veterans through telephonic communication or virtual collaboration technology, which we call the VetAdvisor virtual room. In the virtual room, the veteran and the coach interact as avatars. This highly immersive virtual environment provides strong feedback that enhances collaboration and communication.

Use of this virtual technology assists veterans in their reintegration efforts in a number of ways.

First of all, it allows the veteran to discuss personal issues from the privacy of his or her home or private setting of choice. Veterans may be more willing to acknowledge the magnitude of their issues in this private environment.

Second, it saves the veteran time and travel costs associated with office visits by bringing nonclinical support virtually to them. For today's Internet-savvy generation of veterans and their families, this form of communication feels more natural than traditional communication methods.

In the past, veterans who opted to use virtual room health coaching required wired broadband Internet connectivity for their desktop or laptop computers to access this virtual world. However, vet-

erans who reside in rural areas can face challenges acquiring such broadband services. Recognizing this limitation, VetAdvisor worked with our technology partners to leverage the most ubiquitous of consumer electronic devices, the mobile phone.

Mobile devices will allow patients to wirelessly access health care and is an important component in VA's transition to the patient-centered medical home model. To address this effort, VetAdvisor will launch a virtual world mobile phone capability, for example, an Apple iPhone, in the fall of 2010. By extending the virtual world to mobile phones, we can significantly increase the veteran user base in rural areas where broadband services are not available but cellular service is.

For veterans who opt not to use the virtual world, they simply may use their mobile phones to obtain health coaching services. We envision veterans using these mobile devices anywhere and anytime they desire to work with their health coach. So, for example, if you had a veteran who wanted to conduct a session with their health coach during their work lunch break, they could do that from their car, their office, or other location that provides privacy.

The VetAdvisor program can be offered throughout VHA to ensure that veterans do not fall through the cracks. It provides VA with an effective mechanism to overcome access to care challenges in rural areas by using wireless solutions to provide outreach and ongoing support to veterans regardless of where they live. Without this program, many of these veterans might not return to VA to get the help they need or have as successful a return to their jobs, schools, and families.

On behalf of Three Wire and MHN Health Net, we would like to thank you again for your interest in the wireless capabilities of the VetAdvisor program and how we serve veterans and their families in geographically remote areas. We are grateful to the Subcommittee for its leadership and commitment in identifying innovative programs that assist veterans.

Thank you.

[The prepared statement of Mr. Frank appears on p. 71.]

Mr. MICHAUD. Thank you.

Mr. Mize.

STATEMENT OF JOHN MIZE

Mr. MIZE. Chairman Michaud, Ranking Member Brown, and Members of the Subcommittee, thank you for the opportunity to testify this morning.

LifeWatch is a health IT telemedicine company based in Rosemont, Illinois. We provide monitoring services nationally for over 15 years, and we represent the future of medicine in the United States. It is our privilege to serve the Department of Veterans Affairs in almost 40 facilities.

Currently, our service has helped diagnose patients suffering from cardiac arrhythmia and obstructive sleep apnea in a near, ambulatory, and real-time environment. This virtual service environment is a launching pad for future disease-specific management of health data, supporting improved patient outcomes, continuity of care, reduction of emergency room visits, and unnecessary hospital readmissions.

The LifeStar Ambulatory Cardiac Telemetry service is based upon an algorithm that automatically detects and transmits via cellular networks clinically significant changes in heart rate and rhythm. I am actually connected on the device right now. So, for example, if you are feeling dizzy, your cardiologist might prescribe our service to help diagnose what is causing the changes in your heart rate or heart rhythm. The VA medical center completes the physician's enrollment order to LifeWatch; and we, in turn, ship the device to the patient's house with all the necessary equipment.

The LifeStar ACT service increases the diagnostic yield compared to antiquated technology, increasing the likelihood that a diagnosis will be made and a treatment plan incorporated, which ultimately improves patient outcomes and reduces the cost of treating cardiovascular disease and stroke for the Department of Veterans Affairs.

Additionally, the service allows veterans to remain in their home, reduces travel reimbursement expenses, and allows VA medical expenses to ship employee resources to other responsibilities that cannot be provided in the home. The impact for rural veterans is even more pronounced in regards to cost savings, access to care, and improved outcomes.

LifeWatch has also recently introduced a home sleep testing service for the diagnosis of obstructive sleep apnea. Wait times for sleep labs within many VA facilities exceeds 6 months, and as a solution many facilities utilize fee service to push patients to commercial sleep labs at Medicare rates. Our service is less than half the price of utilizing a commercial sleep lab, stands to eliminate chronic patient waiting lists, and helps improve compliance as the testing is all done in the patient's home.

According to a recent article published in the *USA Today* a couple of weeks ago, veterans are four times more likely than other Americans to suffer from sleep apnea. About 5 percent of Americans suffer from sleep apnea, compared to 20 percent of veterans.

While there are many success stories, we have also had our fair share of struggles within the Department. We are a General Services Administration small business vendor; and, despite our status on the schedule, procurement remains a struggle, necessitating contracting at the facility level. It can take upwards of 2 years for some facilities to finalize the budgeting and contracting process, despite clinicians requests to utilize the beneficial service.

We have seen some success with Project Hero as an in-network provider. The program appears to expedite the process and simplify procurement for facilities in the four Veterans Integrated Service Networks under the demonstration project.

Additionally, we have struggled with a lack of quality of care in terms of standard of care for remote cardiac monitoring. In 2004, Medicare placed a requirement on remote cardiac monitoring, which included the necessity of providing 24-hour live attended coverage for patients wearing ambulatory cardiac devices. The VA does not follow the same standard across the board.

Lastly, we have struggled with a lack of clarity on how to interface our data with Vista Imaging/CPRS electronic medical record system within the VA. Multiple clinics have requested our data be interfaced, and in fact many facilities will not use our service until we are interfaced. Despite the demand among cardiology, we have

hit multiple roadblocks in terms of how to move forward. We are eager and ready to provide a secure interface with the Department of Veterans Affairs, which will most certainly improve the standard and efficiency of care for our veteran.

Despite our challenges, we have still been impressed with the many facilities that utilize our wireless services. We also commend the Department of Veterans Affairs for their proactive approach to treating rural veterans with the use of telemedicine under the Office of Care Coordination. The VA is clearly a leader in delivering telemedicine.

Mr. Chairman and Members of the Subcommittee, LifeWatch sincerely appreciates the opportunity to submit testimony and looks forward to working with you and your colleagues on improving the quality of care for our Nation's veterans with the use of advanced technology.

Thank you.

[The prepared statement of Mr. Mize appears on p. 75.]

Mr. MICHAUD. Thank you very much, and I would like to thank each of you for your testimony this morning.

Since the votes will be called very shortly and we still have one more panel, I will submit my questions in writing. Hopefully, you will be able to answer them when you receive them.

Mr. Bilirakis.

Mr. BILIRAKIS. Thank you, Mr. Chairman. And I would like to do the same. I would like to submit my questions in writing as well.

Mr. MICHAUD. Mr. McNerney, do you have any questions?

Mr. MCNERNEY. Thank you, Mr. Chairman.

I feel a little bit pressured to do the same thing, but I just have one comment.

What you are saying, what everyone is saying, sounds really great. The VA or the veterans—group of veterans is a great sample. It is a great group of people to try new technology on.

But I also get a feeling inside that some of the technology is not going to work, and some of our veterans are going to get hurt by the sort of—the new technology that is not done yet, that has not been tested out. Do any of you have any comment on that?

Mr. DICKS. My personal feeling is that we are not really inventing new technology here, at least in our company, and a lot of us aren't doing that. It is technology that is already available today. We are just repackaging it. And I believe we are at—in health care, we are at the tipping point to a point where it is causing them more harm to not be with the technology than to be without it.

You let a disease exacerbate—right now, we are wasting taxpayers' money on a regular proportion of bases for not implementing this technology. Because they are in rural areas, you can't get them in to the doctor on a regular time. They don't go to the doctor because it takes 2, 3, 4 hours to get there. Then it exacerbates to where it is an \$8,000 emergency room visit.

You want to try to put technology like this in place that is simple, that is accountable, and creates a sense of accountability for them to start following their doctors' orders, and that leads to compliance through them taking their medication and staying out of the hospital.

Mr. MCNERNEY. Thank you.

Briefly.

Dr. NGUYEN. I will just add real quick that the VA through its history has been an innovator in showing how technology can be used to control cost and increase care. And I think that is particularly important now that as we look in a world of health care reform—to me, as a physician, what I see very clearly is we are making a significant bet in our country that we can provide more Americans into structure-coordinated care and in the process save money, and I don't see how we can do that without leveraging innovations. And I think there are very—all the technology we are talking about today in most industry, finance and otherwise, has already been done. We are just trying to bring them into health care.

Mr. MCNERNEY. I want to yield back to the Chairman at this point.

Mr. MICHAUD. Thank you.

Mr. Snyder.

Mr. SNYDER. Thank you, Mr. Chairman.

Thank you, gentlemen, for being here.

Why aren't there any women CEOs of these companies?

Dr. NGUYEN. We have a woman Chief Operating Officer.

Mr. SNYDER. There you go. It seems like we are perpetuating—may be perpetuating the problem of leaving women out of health care.

I wanted to ask just one quick question of Mr. Cnossen. I was struck by one of the things you said, which was I think you used the example in your oral statement of a person may get a blood pressure reading every 6 months at home. Maybe just hearing from you generally on the issue of I don't think technology—the goal for technology should not necessarily be just more information. It should be more helpful information.

I mean, for years, if we had wanted blood pressures more often than every 6 months, we would just teach the person how to take the blood pressure daily, four times a day.

Thirty years ago, I sent a teenager home who was an early preeclamptic and showed her how to take the blood pressure at age 16 because she was, I thought, the only person in the household that really could handle that. And I got a phone call one night that said, Dr. Snyder, it is—whatever it was—and I went out to the house, and we sent her to the hospital, and she delivered.

So this is one of the issues that we have to make sure—we can overload our monitors, our doctors, with too much information. I mean, I, frankly, don't know. I don't want to know what my heart is doing every minute. In fact, that is not what the studies on arrhythmia are based on. They are not based on constant monitoring. They are based on what is my blood pressure in 6 months, in 3 months, whatever it is. That is an important distinction, is it not?

We want helpful information, information that leads to proper decision-making. We don't want to flood the system with information which may in fact not be helpful but just flood the system.

Mr. Cnossen, I will let you respond to that.

Mr. CNOSSEN. Sure, absolutely.

And clinician acceptance is key to making these technologies become more readily available. What we need in addition to these technologies are some tools that take the data, aggregate it into

graphs and trending, such that there aren't a bunch of data points but rather an indication over time of what a reading would do.

Personally, I have a little bit of hypertension. And since I am an engineer I use an Excel spreadsheet and take my readings maybe four times a week, put them in a spreadsheet, and show that to my doctor. And you know he sort of looks at it, throws it away, and takes it with his own certified blood pressure reading.

Mr. SNYDER. My kind of guy.

Because information doesn't always lead to better outcomes. In fact, I can take some patients and—I mean, we all know that. Maybe I am one of those—and I can get them on edge. I can get them going to the emergency room frequently.

I mean, the reality may be on your patient the doctor may be saying 6 months is fine. You know, we know that blood pressure is one of those things that kills people over years and decades, not over 6 months. So we need to be sure that we are using the technology to help outcomes.

And flooding a doctor's office with information may not necessarily lead to better outcomes. That is part of I think what ongoing research will show. Mr. Mize's using my bedroom as a sleep lab for greatly reduced cost, I think is the kind of technology that is helpful.

Mr. Dicks.

Mr. DICKS. The one thing we are really trying to do with this is not emphasize the technology. What we are trying to do is emphasize—you know, compliance is an overused word, right? We don't want to try to create the Central Intelligence Agency effect here where you get rid of all the operatives in the field and you try to deluge with all the data there is and nobody can make heads or tails of it. We want to keep the operatives in the field—those are the nurses, those are the doctors—and we want to provide them with clean data for them on a regular basis.

But let's just talk about the technology. For the lowest cost possible, the flexibility and simplicity, all I am trying to do is create a sense of accountability between the patient and the caregiver. So if that patient is knowing that somebody on the other end is looking for that reading to come in they are more likely to take the reading, they are more likely to take the medication, and they are more likely to stay out of the hospital.

So we are trying to put that sense of accountability on. We call our technology, 20 percent technology and about 80 percent psychology, right? It is not about the technology. It is about that connectivity you have between the two and that accountability that you set up that is going to drive down health care costs.

Mr. SNYDER. Another issue—and my time is running out. I know we have votes coming up. I will say this as an M.D. We are talking a lot here today about compliance with patients. Several of you up there—I guess Dr. Nguyen is the only physician there—and Dr. Powell.

The providers might benefit from these kind of things, like an airline pilot checklist. We don't do that very well as providers. We think that—a lot of us think, well, we are kind of magic. We just have a sense of it. And the reality is we would probably benefit from some of these technologies within the practice setting, also.

Thank you, Mr. Chairman.

Mr. MICHAUD. Thank you very much, Mr. Snyder.

Once again, I would like to thank all of you for coming here today.

On the last panel we have Kerry McDermott, who is an expert advisor for the Federal Communications Commission. We have Colonel Poropatich, who is the Deputy Director, Telemedicine and Advanced Technology Research Center; and Gail Graham, who is the Deputy Chief Officer for Health Information Management within the VA, and she is accompanied by Dr. Darkins and Dr. Breeling.

I want to thank you for coming today. And if you could try to just summarize your testimony, that would be greatly appreciated as well.

We will start off with Ms. McDermott.

STATEMENTS OF KERRY McDERMOTT, MPH, EXPERT ADVISOR, FEDERAL COMMUNICATIONS COMMISSION; COLONEL RONALD POROPATICH, M.D., USA, DEPUTY DIRECTOR, TELEMEDICINE AND ADVANCED TECHNOLOGY RESEARCH CENTER, U.S. ARMY MEDICAL RESEARCH AND MATERIEL COMMAND, DEPARTMENT OF THE ARMY, U.S. DEPARTMENT OF DEFENSE; AND GAIL GRAHAM, DEPUTY CHIEF OFFICER, HEALTH INFORMATION MANAGEMENT, OFFICE OF HEALTH INFORMATION, VETERANS HEALTH ADMINISTRATION, U.S. DEPARTMENT OF VETERANS AFFAIRS; ACCOMPANIED BY ADAM DARKINS, M.D., MPH, FRCS, CHIEF CONSULTANT FOR CARE COORDINATION, OFFICE OF PATIENT CARE SERVICES, VETERANS HEALTH ADMINISTRATION, U.S. DEPARTMENT OF VETERANS AFFAIRS; AND JAMES BREELING, DEPUTY EXECUTIVE DIRECTOR, OFFICE OF INFORMATION AND TECHNOLOGY, U.S. DEPARTMENT OF VETERANS AFFAIRS

STATEMENT OF KERRY McDERMOTT, MPH

Ms. McDERMOTT. Good morning, Chairman Michaud and distinguished Members of the Subcommittee. Thank you for the opportunity to overview the health care recommendations of the National Broadband Plan.

As you know, Congress mandated that the FCC prepare a National Broadband Plan that “shall seek to ensure that all people of the United States have access to broadband capability” and include a strategy for affordability and adoption of broadband. The FCC was also asked by Congress to address how broadband can be harnessed to tackle important national purposes, including health care. So here are the Cliff Notes.

The U.S. has serious health challenges. There are promising broadband-enabled health information technologies that have the potential to help us improve health outcomes and quality of life, reduce costs, and extend the reach of a limited supply of health care professionals.

However, despite the great promise of these technologies, the U.S. lags behind other developed countries in health IT adoption; and so the plan identifies some of these barriers and makes recommendations to address them. They fall into three main categories:

First, a connectivity gap. Broadband is either unavailable or too expensive.

Second, outdated regulations. Rules that were created when our only interactions with physicians were in their offices not via remote monitoring and video consultations.

Third, misaligned economic incentives. The prevailing fee-for-service reimbursement system pays for volume, rather than outcomes, and places the financial burden on providers while the benefits are realized elsewhere.

So let me briefly overview each.

First, connectivity. When we analyzed connectivity for health care providers, we found that many providers lack adequate connectivity to support full utilization of health IT. For example, approximately 3,600 small physicians' offices are not even served by existing mass market broadband infrastructure. Of these, 70 percent are in rural locations. And 29 percent of rural health clinics do not have access to adequate mass market broadband.

The National Broadband Plan addresses the health care connectivity gap by proposing to revamp the FCC's rural health care program. The program is for public and nonprofit health care providers and is the largest sustainable government fund for health care connectivity. Proposed changes include, one, creating a permanent infrastructure fund; two, broadening coverage for monthly recurring costs to all types of broadband services; and, three, expanding eligibility for the program.

Second barrier, outdated regulations. Dr. Smith highlighted some that the plan addresses, so I will reinforce one specific to the wireless arena, regulatory uncertainty surrounding the convergence of communications and medical devices. With new solutions that enable clinicians and patients to give and receive care anywhere at any time comes a new challenge, blurred regulatory lines. This uncertainty regarding regulatory frameworks and approval processes can discourage private-sector innovation and investment in wireless health and ultimately delay or prevent the availability of such solutions.

The plan calls for the FCC and the FDA to build on their long history of collaboration to resolve these issues. The agencies have already begun to act on this recommendation and are holding a joint public meeting on July 26th and 27th. Through this forum, we will bring together various stakeholders to begin to better understand the types of devices and applications that are being introduced, clarify the requirements that apply, and improve the regulatory processes to the extent possible.

Third barrier, misaligned economic incentives. Within a fee-for-service reimbursement system, providers bear the cost of health IT implementation and changes to workflow but don't fully capture the economic gains created through improved clinical outcomes. The plan recommends several steps to move toward an outcomes-based reimbursement mechanism for e-care technologies and urges HHS to propose specific programs and reimbursement changes that will help realize the value. Without reimbursement reform, the market for wireless health IT solutions is limited; this in turn, inhibits investment and innovation.

In summation, the National Broadband Plan's health care recommendations address the infrastructure, supply, and demand concerns associated with utilization of promising health IT solutions so that all citizens may realize their health benefits and cost savings.

I thank you all for giving me the opportunity to speak today.

[The prepared statement of Ms. McDermott appears on p. 77.]

Mr. MICHAUD. Thank you.

Colonel.

STATEMENT OF COLONEL RONALD POROPATICH, M.D.

Colonel POROPATICH. Good morning, Chairman Michaud and distinguished Members of the Subcommittee. I am Ron Poropatich. It is a pleasure to be able to talk to you a little bit about the Army Medical Department's mobile health projects, future initiatives, and challenges in implementing these kinds of capabilities both stateside and overseas. I would like to focus on three projects and succinctly go over an overview of what they entail.

We currently have 11 active projects that we are doing at the Telemedicine and Advanced Technology Research Center located at Fort Detrick, about 50 miles northwest of Washington. The first project deals with soldiers back from the war with a variety of wounds, traumatic brain injuries, psychological health. They get care at Walter Reed, let's say. Then they go back to their homes to recover. These are Reservists and National Guardsmen. The question is, how do we reach out to them on a regular basis?

We have a care team located at a community based warrior transition unit. There are nine of them in the States. We are currently up and running as of May of last year at five of these sites located in Massachusetts, Virginia, Florida, Rock Island, Illinois, and Alabama, covering 26 States. Many of these soldiers are living in remote areas. We push down onto their own cell phones secure messages that are HIPAA compliant that allows us to give them wellness tips on sleep, pain issues, reminders about job opportunities and educational issues, as well as announcements and overall projects dealing with appointment reminders. In the Army, we have about 10,000 missed appointments per month currently. And, again, appointment reminders are a key part of the program as well.

This project has been successful in that we, as of 1 year—and this is the first of a five-phase rollout—we have 300 soldiers enrolled in the first phase, we have reached out to over 100 case managers, and have generated over 20,000 messages. Of those 20,000 messages, 63 percent are appointment reminders, 17 percent are health and wellness tips, and 12 percent are unit-specific announcements.

There are challenges to overcome any of these kinds of projects. We have to push the content onto the soldier's cell phone. We are not buying them one. We have to deal with over 300 different types of cell phones that are out there going across four different wireless telecommunications companies. We have been able to work through those challenges at no cost to the soldier.

That, however, is important to understand the challenges in just getting to that stage. We are also aware of the need to expand this

across the Navy, the Air Force, and the VA; and we have generated discussions at three different VA institutions.

The second project I would like to highlight briefly is maternal fetal health, Text4Baby. It is a public-private partnership that has already been up and running for the last 4 months, 46,000 women, over 2 million text messages being pushed out onto pregnant women's cell phones.

We are going to be rolling this particular project out as a DoD partner, an outreach partner to this program, going to the Madigan Army Medical Center at Joint Base Lewis McChord in Washington State. We are going to be studying this under our research protocol looking at smoking cessation and postpartum depression, realizing that many of our pregnant mothers are dealing with other children, with a spouse who is deployed, adding new stresses to that mother.

The third wireless application again is a little bit different than the first two. Here we are pushing video onto a smart phone for a diabetic patient population in hopes of changing behavior to make patients more compliant with home blood glucose monitoring, nutrition, and exercise. This is a research project approved at Walter Reed Army Medical Center, where I practice medicine 1 day a week. It has been up and running for a year, 170 patients enrolled in this study.

We found that of the patients that have the video versus those that don't only half the people actually looked at the video, but those that did had a statistically significant reduction in their glucose, which is important to realize.

Regarding the big Army, we want to leverage what the big Army is doing. They have gone out to Cupertino, looking at Apple and BlackBerry and other labs. The Research, Development, and Electronic Command out of Fort Monmouth, New Jersey, has a big interest in seeing how we can take mobile health onto the battlefield.

We are interested in leveraging in big Army's interest and applying this same capability to further health care outreach within the U.S. Army Medical Department.

We also realize, based on a recent document approved—that DoD instruction May—of last month looking at medical stability operations and realized that the rest of the world's cell phone penetration is even greater than America's when you look at it. Therefore, we see great opportunity in leveraging the cell phone capabilities that we are doing stateside and offering it as potential solutions to the developing world.

There are many opportunities, but there are considerable challenges. Challenges include integrating this content into an electronic medical record, the security issues that we talked about, the regulatory issues with the FDA, is it a medical device or is it still just a cell phone, and information overload to physicians where clinical business practices have to change.

We are committed to developing and expanding mobile health in the military. I would like to thank you for allowing me to highlight briefly some of the Army Medical Department's accomplishments, and thank you for your continued support to those who serve our Nation.

[The prepared statement of Colonel Poropatich appears on p. 80.]
Mr. MICHAUD. Thank you very much, Colonel.

Ms. Graham, could you summarize your written testimony?

STATEMENT OF GAIL GRAHAM

Ms. GRAHAM. Good morning, Mr. Chairman and Members. Thank you for the opportunity to testify about VA's efforts to deliver optimal health care to veterans in rural areas through the use of innovative wireless health technologies.

I am accompanied today by Dr. Adam Darkins, Chief Consultant of Health Services for the Office of Patient Care Services, who has been referenced multiple times during the earlier testimonies; and Dr. James Breeling, Deputy Executive Director, Office of Information and Technology, Department of Veterans Affairs.

Wireless technologies are part of an overall continuum of care and not a stand-alone entity within VA. We are currently undertaking the most significant change to our model of care delivery since the rapid expansion of the Community-Based Outpatient Clinics that began in the 1990s. But, in many ways, this new innovative approach is actually a continuation of the same strategy that VA has pursued to bring care closer to our veterans and make it as accessible as possible.

Our mission of veterans-centered care engages veterans, families, health care teams in partnership to improve communication and ensure the needs and the preferences of the patient are met. Delivering optimal treatment to veterans in rural areas involves significant challenges, as have been noted by many previous speakers. Emerging technology and new models of care promise to improve clinical quality and reduce cost.

VA is committed to pursuing strategies that will achieve these ends. Our aim is to ensure that our rural veterans receive the same quality of care. VA is exploring applications of wireless technologies to enhance care. For example, VA has installed various small aperture terminal satellites on the 50 mobile Vet Centers that were purchased recently, which are used primarily in rural areas for veterans outreach and readjustment counseling services to veterans but can be also used in case of emergency for provision of care.

We also use wireless technology to assist our veterans with disabilities with quick access to information and to foster opportunities to live at the highest level of functionality possible.

In our medical facilities, we are completing wireless local area network projects to improve the coverage and reliability of mobile devices, including those used for bar code medication administration and laptop computers for our clinicians to use in the delivery of care and the access to VA's electronic health record.

VA dental providers are using wireless technology to access software designed to improve point-of-care decision, and this technology significantly improves medication safety by providing important direct interaction analysis and side effect profiles for treatment outcomes to a vast knowledge base available at the provider's fingertips.

My HealthVet, the VA's online personal health record, is yet another area of significant progress for wireless technology. My HealthVet provides veterans with online access to VA health care featuring patient-friendly health education information and wellness reminders for preventative care.

A veteran who was an early adopter in the pilot program described the application's impact to his life by saying, I feel more in control and aware of my health care choices.

Having veterans as a partner in their health care is essential for the success at VA. VA was awarded a rural health grant to improve access to care by engaging our veterans in co-designing improvements to My HealtheVet. We have conducted sessions in five rural communities with veterans who suggest specific changes to My HealtheVet, including the addition of a mobile version of this application. This prototype will be evaluated by veterans and approved for concept environment, and the second phase of this project will support further meetings with veterans for feedback on visually modeling the complete set of functions they desire, recognizing that many times taking things from the electronic health record or full view on the Internet has its challenges.

Around the world, mobile and wireless devices are increasingly used to connect people to the Internet. In early 2009, VA launched a mobile-friendly version of its Internet Web site. VA's mobile site tailors key VA content from mobile devices and is designed to be compatible with multiple bands of cell-based Internet browsers. We want to be accessible and transparent to our veterans and their families wherever they may be.

Looking ahead, VA is examining the potential for additional innovative applications targeting specific populations of veterans such as those with traumatic brain injury, post-traumatic stress disorder, or visual impairments. We also anticipate development of more resources and tools for clinicians and veterans. Like you, VA strives to ensure that every veteran who receives care from VA has access to its world-class care and benefits.

Mr. Chairman, this concludes my prepared statement and I am pleased to address any questions. Thank you.

[The prepared statement of Ms. Graham appears on p. 83.]

Mr. MICHAUD. Thank you very much, and I would like to thank all of you.

Since we only have 3 minutes to go vote, we have a choice of either holding everyone here for about an hour or for us to submit questions in writing. So we have decided to submit questions in writing.

But I really appreciate all the testimony here today from this panel and the other two panels, and we will definitely have a lot of questions as well. So I want to thank you very much. This is a very important issue and one that there is a lot of interest in.

Mr. MICHAUD. So, without any further ado, I will adjourn the hearing. Thank you.

[Whereupon, at 12:00 p.m., the Subcommittee was adjourned.]

A P P E N D I X

Prepared Statement of Hon. Michael H. Michaud, Chairman, Subcommittee on Health

The Subcommittee on Health will now come to order. I would like to thank everyone for attending this hearing. The purpose of today's hearing is to learn about the wide range of innovative wireless health technology solutions and their potential application to help our veterans living in rural communities.

Of the nearly 8 million veterans who are enrolled in the VA health care system, about 3 million are from rural areas. This means that rural veterans make up about 40 percent of all enrolled veterans. For the 3 million veterans living in rural areas, access to health care remains a key barrier, as they simply live too far away from the nearest VA medical center. Unfortunately, this means that rural veterans cannot see a doctor or a health care worker to receive the care that they need when they need it. Given these barriers, it is no surprise that our rural veterans have worse health outcomes compared to the general population.

This is where I see the great potential of innovative wireless health technologies. VA certainly is a recognized leader in using electronic health records, telehealth, and telemedicine. However, wireless health technologies also include mobile health, which truly is the new frontier in health innovations. Mobile health makes it possible for health care professionals to receive real-time health data such as vital signs, glucose levels, and medication compliance because data from the patient's mobile sensors are relayed over wireless connections. Mobile health also makes it possible for health care professionals to download health data using PDAs and Smartphones. These innovations not only empower our rural veterans, but can improve health outcomes as veterans have the necessary tools to better manage chronic diseases and receive timely health care in the comfort of their homes.

I look forward to hearing from our witnesses today, as we learn more about innovative wireless health technologies and explore ways that we can best support wireless health solutions in the VA.

Prepared Statement of Hon. Gus M. Bilirakis, a Representative in Congress from the State of Florida

Thank you, Mr. Chairman. And, good morning and welcome to our witnesses and audience members.

I'm excited to be here with you all today to discuss wireless health technology within the VA, particularly how it can be utilized to increase access to care and improve patient outcomes for veterans in hard-to-reach rural areas.

Approximately 40 percent of the veteran population resides in rural areas and those numbers are expected to increase as veterans of Iraq and Afghanistan return to their rural homes. Living in a hard-to-reach area presents numerous barriers to care for veterans who must often drive long distances and find overnight accommodations to make appointments at distant VA facilities.

These factors would be significant for anyone but are especially burdensome to veterans who struggle with pain, disability, or chronic illness. I am proud of the work we have done on this Subcommittee to help ease the burdens rural veterans face but, as always, more work remains.

VA currently operates the largest telehealth program in the world, operating in 144 VA medical centers and 350 VA community-based outpatient clinics. Estimates indicate that 263,000 veterans were cared for using VA's telehealth initiatives in fiscal year 2009 alone.

Telehealth is the provision of health care services through telecommunications technologies including cell phones, Smart phones, the Internet, and other networks. When a patient receives a text message reminder from their doctor, they are engag-

ing in telehealth. When a doctor is able to monitor an at-risk patient's blood pressure or heart rate through a remote monitoring device, they are engaging in telehealth. When a specialist at a VA medical center is able to communicate with and make a vital diagnosis on a veteran patient at a community-based outpatient clinic many miles away, they are engaging in telehealth.

Early results indicate that when wireless technology is utilized effectively, it can be a tremendous benefit, especially for rural veterans. From these programs we are learning that when technology is incorporated into health care, it can improve access, efficiency, innovation, and outcome while reducing barriers to care.

While such technology is not without its challenges, I am encouraged by the early successes of VA's telehealth programs and I look forward to learning more from our discussion this morning.

I yield back the balance of my time.

**Prepared Statement of Joseph M. Smith, M.D., Ph.D., Chief Medical and
Science Officer, West Wireless Health Institute, La Jolla, CA**

Chairman Michaud and Ranking Member Brown, thank you for the opportunity to testify before the Committee about addressing the health care needs of veterans, particularly those living in rural areas, and how wireless health technologies can help overcome barriers to accessing care. My name is Dr. Joseph Smith, and I am the Chief Medical and Science Officer of the West Wireless Health Institute. I have spent the last 25 years at the intersection of medicine and innovative technology, practicing medicine and the technology-intensive subspecialty of clinical cardiac electrophysiology in academic and clinical settings, and most recently, concentrating on advancing the development of emerging technologies to solve unmet needs in health care.

The West Wireless Health Institute is a non-profit medical research organization that was launched last year by two visionary entrepreneurs, Gary and Mary West, with the primary mission of advancing wireless health technologies to lower health care costs. The Wests, through their family foundation, have granted almost \$100 million to the Institute to date. We are focusing these resources to create a unique, cross-functional organization comprised of physicians, scientists, engineers, health economists, and experts in reimbursement and regulatory policy to drive systematic change in health care delivery. With 42 members of the team already in place, we are hiring at a pace of about one person per week and hope to employ a world-class staff of 80 by the end of this year. Toward our goal of dramatically lowering the cost of excellent health care, we are innovating and incubating promising technologies; validating their value to lower costs; actively engaging with policymakers and other stakeholders to accelerate the availability of these solutions; and collaborating across sectors including health care, technology, business, government, and academia.

Wireless sensors that enable remote diagnosis, monitoring and treatment support are among the innovations that will enable these aims to become a reality, as well as alleviate some of the burgeoning costs within the VA health care system. In general, wireless sensors and other mobile devices accurately monitor a variety of physiological functions and shifts, including respiration, body temperature, heart rate, and blood glucose levels. A patient with high blood pressure, for example, can be monitored with a wireless device that captures physiological changes and sends an alert to the patient's provider, with the unprecedented potential of preventing acute and long-term complications such as stroke, heart attack and kidney disease.

Because of their pervasiveness and low cost, cell phones and other wireless technologies are well-suited to cheaply transmit information and help patients and health care providers manage chronic diseases. Wireless technology offers real-time and ongoing diagnosis and monitoring of a patient's condition, whereas in-person, physician office visits present only a snapshot of the patient's condition at a fixed time and place. Ultimately, these solutions are driving a new infrastructure independent model of health care, which translates into the right care, at the right time, wherever people need it.

For veterans residing in rural and remote areas, this means not having to incur the burden of finding considerable time and resources to make repeated visits to distant facilities. We know from talking to VA practitioners in rural areas that distance is one of the greatest barriers to accessing care, particularly for those with chronic conditions—the very patients who need the most support. We are continuing dialogue with the VA at local and national levels to identify solutions for making a significant impact on this front.

We also share the great concern that our Nation's health care system is itself ill, swollen and inflamed by excessive costs derived from an evolution of unfortunately perverse incentives. Doctors and hospitals are fiscally incentivized by volumes of procedures and face-to-face encounters, while patients and families wish to maintain health and wellness and avoid costly and complex interactions with doctor's offices, clinics and hospitals. And just earlier this year, we passed into law a sweeping reform of health care insurance that will dramatically increase access to a health care system that seems ill-poised to meet the challenge. The imperative for change in health care delivery is undeniable, and the opportunities afforded by emerging wireless health care solutions are compelling. We believe the VA system has provided an illuminated path to the appropriate deployment of these promising technologies.

Specifically, we commend the VA for its Care Coordination/Home Telehealth (CCHT) program which has demonstrated a 25 percent reduction in bed days of care (including 50 percent for patients in highly rural areas) and a 19 percent reduction in hospital admissions by linking chronically ill veterans with health care providers and care managers through videoconferencing, messaging and biometric devices, and other telemonitoring equipment. The CCHT program appears to be the largest telehealth program in the world, with 43,000 senior veterans receiving home care for chronic disease management. Under the VA CCHT program, one nurse is able to extend his or her reach to 'touch' 150 patients remotely on a daily basis. With 32 million individuals soon to be provided comprehensive health insurance and the shortage of physicians expected to exceed 125,000 within 15 years (according to the Association of American Medical Colleges), the VA's CCHT program offers substantive proof that wireless health technology can dramatically increase the efficiency of already overstretched health professionals to help patients no matter where they are or when they need care.

We believe the VA's CCHT program should take the next step and incorporate innovations beyond traditional telehealth equipment, much of which still requires care within VA clinics or other fixed locations. We encourage the VA to evaluate and implement wireless health solutions that will complement and further extend the reach of the CCHT program, including wireless biometric sensors that monitor highly relevant physiologic parameters, track disease activity on a continuous basis, and transmit that information to the patient's health care provider. This technology enables providers and patients themselves to monitor and diagnose their conditions without a facility in-person visit.

We understand the VA is now undertaking the construction of two new hospitals at the cost of \$1.8 billion. Certainly, those hospitals will offer important access for veterans in those discrete communities where the geographic density is sufficient to motivate such investment. However, almost 40 percent of veterans enrolled in VA health care live in rural or highly rural areas; an even higher proportion of veterans returning from Iraq and Afghanistan reside in rural areas. Imagine how many veterans in remote areas across the country could be reached through wireless technologies with a similar expenditure of these precious resources: the CCHT's program cost is \$1,600 per patient per year—meaning an additional 225,000 veterans in remote areas could be reached for a comparable cost over a 5 year period. And as the CCHT program demonstrated, these investments deliver a return in lower overall costs and greater patient satisfaction, carefully managing the VA's limited resources while improving patient outcomes.

Unlike traditional fee-for-service health care where providers currently have little incentive to expend resources on technology that results in savings to a different "silo," an integrated, self-contained delivery system such as the VA can readily demonstrate the cost-savings that can be achieved by greater utilization of wireless health technologies by tracking the decreased hospitalizations, clinic visits, and other traumatic and acute interventions that result when chronic disease is met with continuous care as opposed to episodic and expensive rescue.

To this end, the West Wireless Health Institute is currently exploring a demonstration research project with the VA in San Diego with a small cohort of recently diagnosed PTSD patients. The project will incorporate a mobile device with videoconferencing capabilities to enhance crisis management, regular "check-ins" and biofeedback therapies. We will be demonstrating the value of this inexpensive and integrated wireless health solution for increasing access to real time support for veterans with PTSD (and potentially decreasing hospital admissions and acute events). This outpatient model of support enables face-to-face access to a clinician off-site at any time and can be used across numerous disease states.

On a larger scale, an important step that the VA has recently announced is the new \$80 million VA Innovation Initiative (VAi2), which will improve veterans' care by tapping into private sector expertise and creativity. We encourage VAi2 to accelerate the evaluation of wireless health solutions that enable home and mobile moni-

toring of diverse and complex signs, symptoms and biometrics, patient- and population-based dynamically learning treatment algorithms, and remotely titrated therapies for a wide range of chronic and acute care needs.

It is important to note that a critical reason the VA can leverage wireless health technology is because its health care providers within the VA are able to operate across State lines. Currently, non-VA physicians are licensed by States and cannot routinely practice medicine across State lines, including through remote monitoring services. This creates a serious impediment to wide deployment of wireless health solutions and frustrates the ability of our broader health care systems from reaping the cost and care efficiencies enabled by these solutions. The Federal Government must follow the VA's lead in crafting a policy to address this inter-State obstacle to widespread adoption of wireless health technology.

Also imperative to extending veterans' access to wireless health technology is the rapid expansion of broadband to rural and remote areas. The FCC has noted that 14–24 million Americans do not have access to broadband where they live, even if they want it. Broadband access is more than connecting individuals to Google and YouTube; it's about dramatically transforming the delivery of health care to people no matter where they live. We commend the commitment to expanding broadband access through the \$7 billion for broadband networking in the 2009 economic stimulus bill, and we support the FCC's plan to ask the Medicare program for a clear path for reimbursement for wireless health solutions.

Certainly, many of the challenges of expanding utilization of wireless health technology—such as providing a clear, consistent and integrated regulatory and reimbursement environment that fosters innovation and commercialization of wireless health care solutions—are outside the specific purview of the Veterans Administration. Yet the current regulatory disclarity is dampening investment in wireless health technology and chilling this promising engine of innovation because many investors and some telecommunication companies fear FDA's regulation of nonmedical devices (e.g. smartphones of all manner) if medical applications are utilized. The FDA should be supported in the view that the specific sensors, algorithms for interpretation, and specific therapeutic devices should remain the focus of regulatory activity, and the pathways for communication of the information (wireless networks, cell phones, etc.) should be understood to be the purview of the FCC. Regulatory and reimbursement clarity will specifically enhance the VA's ability to adapt truly innovative and cost-saving wireless health solutions for its CCHT program, and will also facilitate the rapid generalizability of the benefits to the broader U.S. population.

The VA has a unique opportunity to enhance the ability of providers and veterans themselves to monitor, diagnose and manage their health conditions more effectively. Just as email, Facebook and Twitter have transformed how we communicate with one another, wireless health solutions offer a remarkably new modality of care where patients can be diagnosed, monitored, and often treated wherever and whenever they need care, and in the process avoid the costly, complex, time-consuming, and inefficient interactions with an already over-stressed and geographically constrained health care system.

In sum, we make the following recommendations that will ultimately increase veterans' access to health care regardless of where they live:

- Following the VA's lead, Congress should create policies that facilitate health care delivery across State lines. Current laws restricting interstate medical practice are dampening innovations that could significantly benefit veterans across the country.
- We encourage the VA to evaluate and deploy newer wireless health technologies within its CCHT program, and take advantage of opportunities like the recently announced VAi2 competition to test biometric sensors and other solutions that facilitate remote access to care.
- In addition, we encourage members of this Committee and Congress to support broadband expansion, as well as a clear and consistent regulatory and reimbursement environment to spur the types of innovations that will truly enable health care delivery “anytime, anyplace.”

One-hundred years ago this Spring, Abraham Flexner was concluding the research for his ‘Flexner report’—widely viewed as one of the most impactful treatises in American medicine, credited for ushering in a revolution in medical education and practice. One pivotal observation in that report remains as true today as it was a century ago: “The small town needs the best, and not the worst, doctor procurable.” Our Nation's veterans living in remote communities deserve access to the best thinking and the best care ... and freeing that care of geographical and infra-

structure limitations is a promise of wireless health care and one that cannot wait for the next century.

We are on the threshold of a paradigm shift in health care delivery, one in which we realize the full potential of the digital and wireless revolution and make 'anytime, anywhere' care a reality. It is clear the VA is on a path to demonstrate that we can effectively reach many of our rural and remote veterans with these approaches, providing a continuous model of care for those dealing with chronic conditions, and in the process enhance satisfaction and drive down costs. It is vital that we learn and take the lead from the VA's early successes to quicken our pace, as patients (veterans and others) are waiting.

We look forward to working with the Committee and the VA in building upon its leadership role in telehealth and helping America's veterans and all of its citizens benefit from the evolution of an infrastructure-independent model of health care.

**Prepared Statement of Darrell M. West, Ph.D., Vice President and
Director of Governance Studies, and Director, Center for Technology
Innovation, Brookings Institution**

Chairman Michaud, Ranking Member Brown, and Members of the Subcommittee. Thank you for this opportunity to testify at this hearing on "Overcoming Rural Health Care Barriers through Wireless Health Technologies."

Since 2008, I have been Vice President and Director of Governance Studies and Director of the Center for Technology Innovation at the Brookings Institution. I am the author of 17 books, including, "Digital Medicine: Health Care in the Internet Era," published by the Brookings Institution Press in 2009. Prior to my current position, I was a professor of political science and public policy at Brown University in Providence, Rhode Island.

The United States has more than 23 million men and women who have served proudly in the military. While the vast bulk of these are men (94 percent), the percentage that is female has increased from four to six and one half percent over the last three decades. According to the U.S. Census, the largest veteran populations live in the South (9.9 million) and Midwest (6.1 million). The number living in the Northeast is 4.6 million. The cities with the highest percentage of veterans include: Hampton, VA (27.1 percent), Clarksville, TN (24.4 percent), Fayetteville, NC (23.7 percent), Virginia Beach, VA (21.7 percent), Colorado Springs, CO (20.2 percent), and Norfolk, VA (19.9 percent).

All of us would agree that in recognition of their valuable service, providing quality and accessible health care to veterans is a high national priority. Yet that task has become more difficult financially because of our Nation's \$13 trillion national debt and \$1.4 trillion budgetary deficit. This is especially the case for rural veterans who live great distances from medical facilities and often have difficulty gaining access to quality care.

For these and other individuals, I suggest that wireless health technologies represent a key ingredient in providing quality and accessible care, and gaining budgetary efficiencies in the process. Health care based on mobile health, remote monitors, electronic medical records, social networking sites, video conferencing, and Internet-based recordkeeping can make a positive difference for many people. We should encourage email reminders to take medicine, mechanisms to rate experiences with doctors and hospitals, and Web sites that make care ratings publicly available to other patients.

Progress to Date for U.S. Veterans

The U.S. Veterans Administration has made outstanding progress on several dimensions of health information technology. It has been a forerunner in the implementation of electronic health records. More so than many private physicians and hospitals, the VA has moved toward electronic management of recordkeeping and system-wide connectivity. Since 1999, with the establishment of the Veterans Health Information Systems and Technology Architecture (VistA), the system has "linked 5.3 million patient records generated at the VA's 153 medical centers, 882 clinics, 207 veterans centers, 136 nursing homes, and 45 rehabilitation centers," according to researcher Alan Naditz.

The VA also has implemented MyHealtheVet, which enables veterans to schedule appointments online and refill prescriptions. They can track their medical tests, chart changes over time, and measure progress towards key goals. It further has established the Health Data Repository that contains a range of additional medical information such as allergies, body chemistry, and microbiology.

These electronic systems have produced very high ratings from veterans. According to an analysis of American Customer Satisfaction Index Web site users by Kim Nazi, those employing these resources gave the VA an overall rating of 8.3 out of 10. Most indicated they intend to keep using online resources and recommend the VA's services to other veterans.

Challenges for Rural Veterans

There are three major challenges for veterans today. First, like every other part of government, the U.S. Veterans Administration faces budget pressures due to high national debt and budget deficits. The high cost of medical care demands attention to changes that improve the efficiency of the overall system.

Second, there has been an increase in demand for medical services. The VA has taken on many more patients at its medical facilities compared to a decade ago. It now serves more than 8 million people, up from 3 million in 1999. This increase raises pressures on providers and makes it crucial to find efficiencies in the system that do not jeopardize quality care.

Third, geographic disparities complicate the delivery of medical care. Rural and non-metropolitan counties had the highest concentrations of veterans, according to the U.S. Census. An American Customer Satisfaction Index survey of 53,788 visitors to the U.S. Department of Veterans Affairs Web site found that 37 percent of veterans say they have to travel an hour or more to their nearest VA facility, according to researcher Kim Nazi.

Medical scientists such as Tam Dao have found that rural patients are more likely than urban ones to suffer depression and, after coronary artery bypass surgery, to require longer in-hospital stays and experience greater mortality rates. Others such as Amy Wallace and her colleagues report that urban veterans have better health care experiences than rural counterparts and that reduced access to medical care may contribute to these geographic differences.

Changes in the System

There is no magic bullet for rising health care costs, either for veterans or non-veterans making use of private medical care. But there have been technological advances that make it possible to improve quality, access, and affordability. Today, there are nearly as many mobile phones (600 million) in existence that can browse the Internet and access email as there are personal computers (800 million) so it makes sense to think about greater use of mobile health.

One of the virtues of the Internet, electronic medical records, and cell phones is that it puts the patient in charge of certain activities. Using remote monitoring devices, people can measure their own weight, blood pressure, pulse, and sugar levels, and send test results electronically to health care providers. They get personalized feedback via email and reminders when they gain weight, have an uptick on their cholesterol levels, don't take their medicine, or have high blood pressure. Social networking sites provide discussion forums and the benefit of collective experience from other people suffering similar problems. Patients take responsibility for their routine health care and rely on physicians for more serious medical conditions.¹

This system is not a futuristic vision, but is within our grasp. It would cut costs by reducing professional responsibility for routine tasks and recordkeeping, while also making it possible for patients to receive higher quality care and be more satisfied with the end-result. As noted below, the technologies for this kind of system transformation currently are available through cell phones, remote monitoring devices, video conferencing, and the Internet.

Remote Monitoring Devices

There are a number of new remote monitors for various health care conditions that put patients in charge of their own test-taking and keep them out of doctor's offices. For example, there are home pulse-taking and blood pressure devices that measure vital signs. AT&T has a new "device certification lab" that tracks health along high-speed broadband networks. Results are electronically sent to a family physician, specialist, or electronic medical record, depending on the wishes of the patient. Zeo is marketing a monitor that measures brainwaves and rates the quality of sleep. Bodybugg has an armband calorie-counter that charts the amount of energy burned through physical movements.

The Triage Wireless company has a "wearable" monitor that records vital signs and transmits them to physicians. It records blood pressure on a continuous basis,

¹This statement draws on my paper, "Customer-Driven Medicine: How To Create A New Health Care System" published by the Brookings Institution in October, 2009. Jenny Lu and Raffaella Wakeman provided research assistance for this testimony.

thereby providing regular information for health care providers. The Corventis corporation has a small sensor it calls PiiX that measures fluid status and respiration for runners. This helps people monitor their physical status during exercise. Intel has a “magic carpet” device that monitors physical movements. Geared for senior citizens at risk of a fall, it tracks people as they walk on a mat to determine who is vulnerable to falling down.

In the area of diabetes, it is crucial that patients monitor their blood glucose levels and gear their insulin intake to proper levels. In the “old days”, patients had to visit a doctor’s lab or medical office, take a test, and wait for results to be obtained. That process was expensive, time-consuming, and inconvenient for all-involved. Having to get regular tests for this and other conditions drives up the costs of medicine.

However, it is possible to use remote monitoring devices at home that record glucose levels instantaneously and electronically send them to the appropriate health care provider. Patients are using with FDA-approved “Glucos Phones” that monitor and transmit glucose information to caregivers while also reminding patients when they need to undertake glucose tests. It is estimated that over 11 million Americans use home monitors for their glucose. Health authorities believe there are over 24 million diabetics in the United States, and the disease is the seventh leading cause of death.

Tiny monitors with magnetic nanoparticles have been developed by researchers at the Massachusetts Institute of Technology to track the development of cancer tumors. Small particles the size of a rice grain are injected during biopsies. Through follow-up MRI’s, doctors can measure whether these monitors clump with the tumor and grow in size. This allows them to get immediate feedback on the size of cancers and whether a specific therapy is working.

Cardiologist Steven Greenberg of St. Francis Hospital in Roslyn, New York uses a wireless pacemaker made by St. Jude Medical connected to a home monitoring device to track heart rhythms and vital signs. Patient information automatically is transmitted to his medical office, which allows him to see which patient has abnormal heart beats and therefore is in need of immediate treatment. He feels this enables him to “stay a step ahead of potentially life-threatening problems”.

Personalized Reminders

One of the biggest problems in medical treatment for either veterans or non-veterans is patients forgetting to take their prescription drugs. It is estimated that only 50 percent of patients take their medication as prescribed. Either they forget to take the drug or they do not take it at the time or dosage set by their physician. This means that we lose half of the benefit of prescription drugs through human error. This costs the systems billions in poor health outcomes.

Digital technology has the potential to help with this and other communications problems. Patients no longer need to visit doctors’ offices to be reminded to take their medicine. They can get personal reminders via email, automated phone calls, or text messages. One enterprising physician named David Green of Cape Town, South Africa noticed that his patients did not always take the prescribed Rifadol medicine for their tuberculosis. He knew that for the drug to be effective, people had to take the pill on a consistent basis. Otherwise, it would have little effect. Doctor Green set up a text messaging service called “On-Cue Compliance” for each of his patients that sent them a daily SMS in English, Afrikaans, or Xhosa. Over the 6-month course of treatment, his service would send a message at a pre-determined time each day reminding them to take their Rifadol.

In the United States, Dynamed Solutions provides “HealtheTrax” software that reminds patients to take medications, set up appointments, and track compliance with medical instructions. This and other types of “virtual health assistants” are particularly helpful with those suffering from chronic illnesses. These individuals need to keep close track of their medical condition and stay in touch with their caregivers. The software is integrated with electronic medical records and can store information in patient’s personal records.

Physicians at Children’s Hospital Medical Center in Cincinnati send teenagers text messages reminding them to take their asthma medication. For young people on the go, remembering to take medication is one of the biggest challenges. Researchers have found that text reminders is effective and that it helps teenagers develop good “self-care habits”.

A company called Proteus Biomedical has a tiny “digestible chip” that can be swallowed along with a prescription drug to notify health care providers that patients took their medication. Using a sensing device, it electronically transmits that information to physicians, who then know for sure that the individual is following the prescribed course of treatment. It is especially helpful with patients suffering

memory loss because those individuals have a high incidence of not taking their medicine regularly. Patients loved the idea of getting personalized reminders from their medical providers. One person wrote that these messages “keep you informed and mean you never forget to take your drugs.”

In general, Americans say they would like to employ digital technologies in their medical care. For example, 77 percent in a national survey said they would like to get reminders via email from their doctors when they are due for a visit, 75 percent want the ability to schedule a doctor’s visit via the Internet, 74 percent would like to use email to communicate directly with their doctor, 67 percent would like to receive the results of diagnostic tests via email, 64 percent want access to an electronic medical record to capture information, and 57 percent would like to use a home monitoring device that allows them to email blood pressure readings to their doctor.

Mobile Smartphones

Cell phones and other mobile devices have gotten smarter and faster. Smartphones such as Apple’s I-Phone, Research in Motion’s Blackberry, Nokia’s E71, and Palm Pre offer advanced features such as mobile email, web browsing, and wireless communications. The sophistication of these devices has spawned a variety of new medical applications that help doctors and patients stay in touch and monitor health care needs.

For example, Sprint has a mobile application that allows physicians to get test results on their mobile device. They can look at blood pressure records over time, see an electro-cardiogram, or monitor a fetal heart rate. AirStrip Technologies markets an application that makes it possible for obstetricians remotely to monitor the heart rates of fetuses and expecting mothers. This allows them to detect conditions that are placing either at risk.

These applications make doctors more efficient because they don’t have to be in the physical presence of a patient to judge his or her condition. Digital technology allows people to overcome the limitations of geography in health care and access information at a distance. This makes it possible for veterans to get a second opinion without visiting another physician by sending that person relevant medical tests. If a personal conference is required, doctors can use video conferencing to speak to patients located in another city or State.

Internet Information

There has been an explosion of Web sites with detailed medical information. Web sites such as WebMD.com, MedlinePlus.gov, MerckSource.com, HealthFinder.gov, and MayoClinic.com answer questions and provide links to discussion groups about particular illnesses. In States such as Massachusetts, California, and New York, and Michigan, consumers can visit health department sites and compare quality performance data on provider care programs. Nationally, the U.S. government has a Web site, www.hospitalcompare.hhs.gov, that evaluates 2,500 hospitals on mortality rates, room cleanliness, call button responses, and how patients judge their quality of care.

The most common Internet searches occurred in regard to specific diseases. Of those who went online, according to a Harris Interactive survey, 64 percent said they searched for information on particular illnesses, 51 percent looked for certain medical treatments, 49 percent surfed for material on diet and nutrition, 44 percent named exercise, 37 percent sought advice on medical drugs, and 29 percent looked for particular doctors or hospitals.

This information had a positive impact on many people. National data demonstrate that 58 percent indicated that online material affected their health care decisions, 55 percent said the information changed their health care approach, and 54 percent claimed the electronic resources made them ask new questions of their medical personnel. When asked how these materials made them feel, 74 percent said they felt reassured and 56 percent felt more confident.

Social Networking for Medical Care

Social networking sites offer great potential to improve care by sharing information among chronic condition sufferers. For example, a network developed by the company PatientsLike Me has 23,000 patients who have signed up to share information regarding five different illnesses: mood disorders, Parkinson’s, multiple sclerosis, HIV/AIDS, and Lou Gehrig’s disease. These individuals describe their symptoms, discuss various therapies, and talk about what works and doesn’t work very effectively. Not only does the site serve as a vital support group for these serious illnesses, it promotes better understanding through the detailed case histories based on personal experiences.

A similar idea draws on crowd-sourcing for feedback regarding medical care and treatment side-effects. It often takes years for patients, physicians, and medical researchers to get definitive results regarding the assessment of drugs and medical therapies. Clinical trials are expensive and time-consuming, and involve randomized assignment to various groups. Results sometimes are unclear and it is hard to recruit sufficient subjects to participate in the evaluations.

While it is important to maintain rigorous approaches to medical research, it is helpful to take advantage of new techniques for getting feedback. Crowd-sourcing is a concept that takes advantage of the collective experience of large groups of people. It allows a variety of individuals to comment on and post experiences with specific treatments. This helps others compare data and see information on what works or doesn't work.

Dr. Amy Farber has developed an online resource called LAMsight that encourages people suffering from the LAM lung disease to share their symptoms and treatment experiences. Web operators take this patient-provided information and compile online databases that are used by researchers to find out what works, what doesn't work, and what drugs generate unwelcome side-effects. Particularly for rare illnesses where it is hard to generate the patient numbers required for clinical trial, she says "patients have been a tremendously underutilized resource." While large clinical trials with randomized assignment clearly need to remain central to drug assessment, digital technology that helps providers and researchers identify worrisome trends represents an additional way to gain useful feedback.

Consumer Evaluations of Health Care Providers

A big challenge with contemporary health care is lack of information among patients about the quality of physician and hospital care. There is some outcome-based information on how many mammograms or other medical tests various facilities perform, but few assessments of the quality of care from specific providers.

Digital technology has the potential to empower the consumer voice in health care and to tie patient assessments to doctor performance. In the entertainment area, for example, the commercial company Netflix has devised a system by which film watchers order movies for home viewing. Upon returning the movie to the company, customers received an automatic email asking them to rate the movie on a five-point scale. This information is anonymously aggregated, and publicly available to other consumers so they can see which movies receive the highest ratings in various categories.

It is possible to create a similar system for rating physicians, hospitals, and other health care providers. Following physician visits, consumers can fill out an email form allowing them to rate different dimensions of medical treatment from timeliness and personal attentiveness to level of knowledge and satisfaction with the overall visit. These quality measures are aggregated and are accessible at a public Web site so others could see the quality assessments.

Consumer Reports has an online hospital rating service of 3,400 facilities based on the national government's Hospital Consumer Assessments of Health care Providers and Systems Survey. Among the items examined include "overall patient experience, doctor and nurse communication, room cleanliness, discharge information, hospital staff attentiveness, communication about new medications, pain control and noise level".

Proposed Changes

There is little doubt that the technology for customer-driven health care is already available. What are needed are policy changes that alter the incentives for patients and health care providers to adopt necessary shifts, and reward good behavior and good health outcomes.

Greater Use of Mobile Health in Rural Areas

Too many parts of our system today do not cover mHealth, digital communications, or wellness programs. Physicians, for example, often are not covered for email or phone consultations. We need policy changes that encourage high quality medical care and make it possible for health providers to be reimbursed for the health they provide.

This is problematic in rural areas because mobile health can improve quality, access and affordability. Video conferencing allows patients who live long distances from VA facilities to get consultations with specialists.

The Geisinger Medical Center tested a "medical home" initiative among Medicare patients and found an 8 percent drop in hospital admissions and a 4 percent reduction in overall health costs over the first year. In this concept, patients are assigned a family physician who acts like a "personal health coach". This coach oversees a group of providers who monitor people's medical condition and use emails and text

messages to encourage people to lose weight, stick to healthy diets, get exercise, and seek relevant care when their status deteriorates.

A Focus on Positive Health Outcomes

Right now, doctors and hospitals do not devote adequate attention to health outcomes. Doctors don't get rewarded for healthy patients or preventive medical care. Indeed, one of the challenges in the current system is the lack of performance data on how patients do. The Federal Government collects statistics by city and state on causes of death, numbers of procedures, and other such information. But there is little outcome information for specific doctors or other health care providers. This makes it difficult to judge quality or create incentives for healthy outcomes. Doctors whose patients remain healthy should receive a bonus and should be encouraged to continue preventive medical care.

Rewards for Good Behavior by Physicians and Patients

We need rewards for good behavior modeled after "good driving" discounts on car insurance. Drivers who do not have accidents or are not cited for speeding or other traffic violations earn a 10 percent discount on their insurance. The program is cost-effective for car insurance companies because safe drivers have fewer accidents and therefore cost the company less in accident repair reimbursements.

Americans eat too much, get too little exercise, and have diets that are too fatty. The result is an obesity epidemic that will push health care costs higher in future and limit people's quality of life. According to the American Obesity Association, over 30 percent of children today are over-weight. This ticking time bomb threatens to explode and have dramatic consequences for national health care spending.

Government programs should offer "good health" rewards to patients and physicians. For example, health programs could provide a preventive medicine fund that reimburses people for regular exercise, good health practices, flu shots, diet advice, and smoking/alcohol/drug cessation programs. This would encourage patients to lead healthy lifestyles.

After the Safeway company instituted a "Healthy Measures" program of cholesterol screenings, blood pressure measurements, and weight loss initiatives, its health costs dropped by 13 percent. More than three-quarters of its employees enrolled in the program and they saved 20 percent on their individual insurance premiums. Pitney Bowes provides \$100 gift cards to employees who enrolled in health courses.

Saving Money and Leading Healthier Lives

The ultimate goal of policy changes is to save money and get people to lead healthier lives. As others have pointed out, the United States spends \$6,102 annually per capita, much more than the \$3,165 spent by Canada, \$3,159 by France, and \$2,083 by the United Kingdom. Yet America ranks 42nd among developed nations in life expectancy. Our average life expectancy of 77.9 years falls well below that of Andorra, the Cayman Islands, and most European countries. We spend a higher percentage of Gross Domestic Product on health than most other nations, but get weaker results in terms of medical well-being.

With America's health care system now costing \$2.4 trillion, we no longer can afford delays in making needed changes. As Peter Neupert of Microsoft's Health Solutions Group has written, "let consumers do some of the work that expensive health-care professionals shouldn't be doing anymore. In the past 10 years, technology has removed travel agents, bank tellers and so on from the middleman position. Online systems, such as Kaiser Permanente's, have increased patient satisfaction and allowed the work of expensive professionals to be replaced."

One of the reasons America spends more money per patient than other countries, but gets weak results, is our low usage of health information technology. Only 15 percent of the 560,000 doctors in America use digital technology to order medication for patients. Industry advocates claim that a move to electronic prescriptions could save \$29 billion over the next decade. According to health experts, digital technology would save money and "make transactions more efficient, reduce medication errors and entice doctors to prescribe less expensive drugs".

A Brookings Institution analysis undertaken by economist Robert Litan found that remote monitoring technologies could save as much as \$197 billion over the next 25 years. Cost savings are especially prevalent in the chronic disease areas of congestive heart failure, pulmonary disease, diabetes, and skin ulcers. With around the clock monitoring and electronic data transition to care-givers, remote devices could speed up the treatment of patients requiring medical intervention. Rather than having to wait for a patient to discover there is a problem, monitors could identify deteriorating conditions in real time.

A 2009 PriceWaterhouseCoopers Health Research Institute study meanwhile found that \$210 billion is wasted through “defensive medicine—doctors ordering tests or procedures not based on need but concern over liability or increasing their income”. Other examples of wasteful spending include inefficient claims processing (\$210 billion), ignoring doctor’s orders (\$100 billion), ineffective use of technology (\$88 billion), hospital readmissions (\$25 billion), medical errors (\$17 billion), unnecessary emergency room visits (\$14 billion), and hospital acquired infections (\$3 billion).

Better use of digital and mobile technology could help on each of these fronts, especially with rural veterans. Electronic medical records would reduce duplicate tests because various physicians would have easy access to the results of past procedures. Automated processing of medical reimbursements would save time and money. Not taking medicine at prescribing times and levels could be improved through remote monitoring and digital tracking. Unnecessary emergency room visits, hospital infections, and medical errors could be reduced through medicine that employs video conferencing and out-patient treatment.

**Prepared Statement of David Cattell-Gordon, M.Div., MSW, Director,
Rural Network Development, Co-Director, The Healthy Appalachia
Institute, and Faculty, Public Health Sciences, Nursing, University of
Virginia Health System, Charlottesville, VA**

Chairman Michaud, Ranking Member Brown, distinguished Members of the Subcommittee on Health, my name is David Cattell-Gordon and I serve as the Director of Rural Network Development, manager of the Office of Telemedicine and a faculty member in Nursing and Public Health Sciences at University of Virginia. I also serve as the co-director of the Health Appalachia Institute, a public health institute serving the citizens of Central Appalachia.

As the son of a distinguished, rural WWII veteran from the famed Iron Men of Metz of the 95th Infantry, a child of the coalfields and as a health care professional serving many rural patients and communities, I am honored to provide testimony on how the Veterans Health Administration (VA) can utilize innovative health technologies to overcome barriers to health care in rural communities.

As a part of the University of Virginia’s pioneering program in telemedicine, I have come to appreciate how information technology can overcome barriers of access. In addition, telehealth and wireless capabilities have consistently demonstrated opportunities for improved health outcomes, decreased isolation, reduced health disparities and substantially reduced costs—a vital issue in ensuring the very best care for the over three million of veterans living in remote, rural communities. Simply put: why would we not invest in this capability?

To make this simple case for investment, I will address today three well documented issues:

1. The substantial, long-standing health disparities in rural Central Appalachian and for rural veterans;
2. The role of telehealth in improving the delivery of health care and educational services to rural citizens especially veterans; and,
3. The opportunities of expanded wireless capabilities to improve the health and quality of life for our rural veterans—men and women who should not be denied access to care based on the reality that their home is a rural community.

Everyone on this Committee, I am certain, is familiar with the award winning production based on the book by acclaimed historian Stephen Ambrose, *Band of Brothers*. As the tagline for this story of Easy Company of the 101st Airborne reads: “The world depended on them. They depended on each other.”

What the Committee probably does not know was that one of this band on whom we all depended, Darrell Shifty Powers, came from Dickenson County in the rural coalfields of Southwest Virginia, a rugged and isolated region. Shifty, a bronze start recipient, returned home after the war to serve as a machinist for the Clinchfield Coal Company. Sadly, Powers died last year on June 17th of cancer.

As Power’s daughter said of her father: “He never bragged about what he did in the war. And for a lot of years, he never even talked much about what he did—unless someone asked him about it.” Bravery and dignity was a constant thread running through the life of Shifty.

1. Barriers to Care in Rural Appalachian Virginia and the Consequences

With his diagnosis of cancer Shifty Powers depended on our systems of care but the geography created huge barriers for him in terms of access to care and communication with health specialists, as the trip to the nearest cancer facility was hours away. The evidence is overwhelming that our rural veterans in Appalachia and other communities suffer far worse health outcomes because of several factors: geographic and personal isolation, limited access to specialty care, lower educational attainment, limited income and often extremely poor conditions within which to manage health.

Demographic Data*	FD I & II	Virginia
Population Growth	- 4.9%	+14.4%
H.S. Graduation Rate	61.0%	81.0%
College Graduation Rate	9.0%	29.5%
Percent of Pop. Working	41.8%	62%
Below Federal Poverty Line	19.5%	9.6%

The seven coalfield counties and one city that make up Health Planning Districts I and II in Appalachian Southwestern Virginia, for instance, are a uniformly rural area of more than 3,200 square miles of mountainous landscape with a population of nearly 207,000. This mostly homogenous population lives primarily in small, geographically isolated communities and suffers from declining population, low educational attainment, high rates of poverty and approximately half the per capita income of the rest of the State. This is true of the many of the veterans of the region.

These persistent social problems are intertwined with significant disease risk factors that contribute to disproportionately high rates of heart disease, cancer, respiratory disease, diabetes, and depression. To complicate these social and health issues, the sharp mountain ridges and deep valleys that divide the region make access to work and health care difficult. There are serious health care workforce shortages in the area and no large-scale population centers capable of financing a full spectrum of specialty medical practice.

Health Risk Factors	PD I & II	Virginia
Obesity	33.5%	25.1%
Hypertension	38.2%	26.7%
High Cholesterol	39.5%	36.2%
Not in Wellness Activity	33.75%	22.6%
Smoking (Adults)	29.1%	20.6%
Smokeless Tobacco Use	16.8%	3.4%

One only has to look at the 10-year history of the Remote Area Medical Expedition (RAM) in Wise, Virginia as an example of the magnitude of need. In 2008, the RAM-Wise expedition, the largest screening event in the United States, provided free medical, dental and vision care to over 3,000 people from the region over a single weekend at an abandoned strip mine. The University of Virginia Health System and its volunteer team of 217 health professionals staffed more than 6,150 patient encounters and contributed care valued at over \$1 million to that event.

Premature Mortality by Disease (adjusted rate per 100,000)*	PD I & II	Virginia
Heart	341*	203
Solid Tumor Cancer	253*	185
Chronic Lower Respiratory	79*	38
Stroke	64	54
Diabetes	80	22
Unintentional Injury	145*	82
Suicide	20*	11

*statistically significant variance

Combined with significant health risk factors like high cholesterol, hypertension, too much smoking, it has led to extraordinarily high rates of premature mortality from all causes—heart disease, cancer, diabetes. In the region we have twice the level of suicides. We are 30 percent more likely to die from diabetes, 44 percent more likely to die from lung disease. We have an epidemic of unintentional fatal overdoses from prescribed narcotics. We have twice the rate of poverty and half the per capita income of the rest of the Commonwealth. The consequence of these adverse socio-economic and health risk factors is that the residents of the region are 26 percent more likely to die prematurely than residents of other regions in the Commonwealth. In addition, the coalfields of Virginia are experiencing a full-scale public health crisis in addiction levels to prescriptive narcotics leading to astronomically high rates of fatal, unintentional overdose. According to the State medical examiner, the adjusted mortality rate from unintentional overdose is 40 deaths per 100,000 in the region compared to 8.3 per 100,000 for the State as a whole. Taken together, the health status of the region represents a significant geographically-based health disparity.*

This is the health environment of much of rural America that it is now time to address. I know this Subcommittee is well aware of the sad facts of the state of rural health care so let the VA lead the way. With some three million veterans who use VA medical services living in rural areas, the delivery of health care is more difficult and more costly. A survey of 767,000 veterans by the VA Health Services Research and Development Office found that rural veterans are in poorer physical and mental health compared to those who live in urban areas.

Many studies, of which this Subcommittee is well aware, speak volumes about the health disparities faced by rural veterans. Veterans who live in rural settings have lower health-related quality-of-life scores than their suburban and urban counterparts. There is increased co-morbidity, more inefficient care, greater use of emergency rooms for primary services, less preventative care and reduced home care. These rural-urban disparities persist even after studies are corrected for age, gender, employment status, priority level, co-morbidity, and the U.S. census region in which the veteran lived. Disparities are evident in those who were both most and least dependent on the VA for health care services.**

As you are also well aware, the VA provides much of its medical care, particularly specialized treatment, in urban settings, which may be difficult for rural veterans to access. VA enrollees also obtain much of their medical treatment in the private sector, particularly if they have Medicare or other insurance and VA care is far away. Rural veterans have lower incomes and less insurance and therefore many have less access to both VA and non-VA care. They report poorer health, which suggests that their medical needs may be not adequately met.**

*All data is from the Virginia Department of Health (VDH) through health records of mortality and incidence rates between 1999 and 2005 as well as the Office of the State Medical Examiner. Socioeconomic and demographic information was extracted from census data from 1990 and 2000 at the Census tract level.

**William B. Weeks, MD, et al. *Differences in Health-Related Quality of Life in Rural and Urban Veterans*, American Journal of Public Health October 2004, vol. 94, No. 10.

Weeks et al. *Veterans Health Administration and Medicare Outpatient Health Care Utilization by Older Rural and Urban New England Veterans*, Journal of Rural Health, Volume 21, Issue 2.

These findings offer clear evidence that living in a rural setting is associated with a worse health-related quality of life. As with other residents of rural regions, a variety of factors may account for these disparities such as access, lower educational attainment, limited specialty care and more infrequent use of the VA health system.

The consequence of these disparities is simply that the rates of premature mortality are higher for rural veterans. While it sounds dramatic, it is true: the issue we are discussing today is a life and death matter. While Congress has appropriated millions to implement a rural health outreach and delivery program it is only one aspect that must be supplemented by continued investment in proven technologies as we will face many challenges not only by our aging and elderly veterans such as Shifty Powers but also by the nearly one-half of veterans who fought in Iraq and Afghanistan and now live in rural settings.

2. The Role of Telehealth in the Delivery of Services to Rural Americans

As a preface to discussions of what remarkable innovations and processes wireless capabilities bring to address health disparities, it is important to set the critical context of improving outcomes for our rural veterans, a service that this Subcommittee is well aware of: telehealth.

Telehealth can reduce many of the barriers of access to locally unavailable health care services. The integration of telehealth into rural communities especially including health information exchange through electronic medical records between the VA and rural health programs has profound implications for the development, support and delivery of health care services in the digital era—an integrated systems approach focused on disease prevention, enhanced wellness, chronic disease management, decision support, quality, ease of access and patient safety. These are all critical resources if we are to achieve equality of care for rural veterans.

Through the incorporation of telehealth into a strategy for the care of rural veterans, a decreasing workforce of clinicians will be able to satisfactorily manage the expanding volumes of medical information, research and decision support analytic tools. This incorporation of telehealth technologies into integrated systems of health care offers tools with the potential to address the challenges of access, specialty shortages, and changing patient needs in both the rural and urban setting. Clinical services delivered via telehealth technologies span the entire spectrum of health care, and across the continuum from prematurity to geriatric care, with evidence based applicability to more than 50 clinical specialties and subspecialties. Cardiology, dermatology, ophthalmology, neurology, high risk obstetrics, pulmonary medicine, mental health, pathology, radiology, critical care, and home telehealth, are some of the many applications in general use, and for which a number of specialty societies have developed telehealth standards. These services can be provided in live-interactive modes and some, asynchronously, using store and forward applications such as the acquisition of digital retinal images of veterans with diabetes by a trained nurse. These images can be sent for review by a retinal specialist to identify patients at risk for diabetic retinopathy, the number one cause of blindness in working adults.***

The aging of our veterans has also already created increased demand for specialty health care services to address both acute and chronic disease in the elderly. Such a demand, in the face of anticipated provider shortages, requires a fundamental shift from the model of physician centered care to one focused on patient centered care using interdisciplinary teams, evidence based medicine, the use of informatics in decision support and telehealth technologies. As an example, nationally, only 2 percent of eligible (ischemic) stroke victims receive brain saving thrombolytic therapies, primarily because this treatment must be administered within 3 hours from the onset of an ischemic stroke under the direction of a trained neurologist. The use of telehealth technologies offers immediate access to stroke.***

***Williams, JM et al, *Emergency medical care in rural America*, Ann Emer Med 2001; 38(3):323–327.

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Again, simply put, telehealth capabilities are integral to rural health, professional educational and economic development by providing essential links to specialty care and continuing education. It also ensures a method of the efficient provision of resources as well as being a tool for the economic development of rural communities.

In an effort to address these significant rural-urban disparities in the Commonwealth of Virginia, we established the University of Virginia Telemedicine program in 1995, specifically to enhance access to specialty health care services and health related education for rural patients and health professionals using broadband telecommunications technologies. With Federal and State support, we have created a 60 site network of community hospitals, critical access hospitals, veteran's clinics, federally qualified community health centers, rural clinics, prisons, schools and State health department clinics located primarily in rural communities in western, southwestern, central and eastern Virginia.

To date, we have facilitated more than 18,000 patient encounters—including many veterans—linking remotely located patients and our University of Virginia health professionals representing more than 36 different medical and surgical subspecialties. These services are provided on a scheduled basis or emergently. We offer store and forward services such as screenings for diabetic retinopathy or breast and cervical cancer. We have provided more than 50,000 radiographic interpretations through our teleradiology program. We provide live interactive consultations using traditional models of video-conferencing and critical care applications, such as acute stroke evaluation and treatment, using traditional videoconferencing and robotic “remote presence” technologies connecting emergency physicians with stroke neurologists. We have saved lives, supported timely interventions, and spared patients and their caregiver’s unnecessary travel and expensive transfer when feasible.

While we have advanced these capabilities, Congress still needs to continue actions to drive broadband enhancement into rural areas and the application of telehealth in this environment by:

- Continuing Federal funding of demonstration projects;
- Reducing statutory and regulatory barriers to telehealth in Medicare;
- Aligning Federal agency definitions of rural with specialty health care shortages, in particular using the definitions of rural applied by the USDA Distance Learning and telemedicine Grant Program;
- Ongoing support and refinement of the Universal Services Fund;
- Improving inter-agency collaboration for telehealth services;
- Encouraging the use of (and reimbursement for) store and forward telemedicine; and,
- Ensuring health information exchange.

3. Opportunities for Improving Care: A Strategic Inflection Point

While the expansion of broadband is the context for removing barriers, and telehealth a critical application, perhaps the most innovative process for achieving the elimination of disparities is wireless communications. It is clear that the world is in the midst of a wireless revolution.

One of the most visible aspects of this global revolution is the cell phone. This tool is no longer a novelty . . . it is estimated that there are now more than 233 million cell phones in use in this country and almost 2.56 billion worldwide. I just returned, for example, from Tanzania where I was on a cervical cancer screening and prevention team seeking to achieve telemedicine connectivity back to the UVA Cancer Center. While we would screen rural Masai tribal women they would text messages to their family, conduct financial transactions and seek key resources.

It should be noted that I maintained cell phone connectivity the entire time . . . even in the heart of the famed Ngorongoro Crater literally hours away from any populated areas. In fact, I had better cell phone coverage in Tanzania, one of the poorest countries in Africa, than I have in the coalfields of Southwest Virginia.

The cell phone taken together with digital networks, remote monitoring capabilities including miniaturized sensors in a broadband wireless environment represents a strategic inflection point in health care which we will look back upon as a critical turning point much like the industrial revolution, the discovery of antibiotics or the invention of the personal computer. This capability, as the first Chief Technology Officer of the United States, Aneesh Chopra, said at the recent meeting of the American Telemedicine Association, is seemingly unlimited in job creation, in reducing health care cost and in improving the quality of life.

Our rural veterans are entitled to access to this resource. And, it makes both clinical and economic sense. With servicemen and women returning from Iraq and Afghanistan—a majority of whom are cell phone users and many of whom are from rural areas—it is increasingly important that we use technologies to link the expertise of the VA medical centers to rural veterans alleviating some of the distance-

based challenges in the areas of primary care, mental health, traumatic brain injuries and even long-term or home-based care remote home monitoring.

You will hear extensively about the critical aspects of the use of cell phones and other wireless monitors for health during these hearings. They are obvious in that this capability has already been proven to be well-suited for cardiac monitoring, blood glucose evaluation, medication compliance, post-surgical follow-up, vital signs monitoring psychological counseling, health information, public health alerts, patient engagement and doctor-patient relationship. These capabilities, in general:

- Reduce the isolation that occurs in rural communities;
- Provide a vehicle for messaging and key health information;
- Support the monitoring of chronic diseases;
- Promote compliance with medication;
- Reduce readmission to the hospital post procedures;
- Guide self-care; and,
- Enable improved care by home nursing.

This abbreviated list in and of itself warrants investment as it represents the perfect storm of improved health outcomes, efficient processes and reduced costs. Just one element in this list—the care of chronic disease—according to the California Healthcare Foundation accounts for more than four-fifths of all health care expenditures. Imagine what it could mean to ensure improved medication compliance, increased exercise, healthy diet and appropriate use of health care resources for the burgeoning numbers of veterans with diabetes. The savings would be staggering. We now need to consider that bandwidth and wireless access are a prescribable medication for the health of our communities.

In certain specialized applications it has already been shown to make dramatic impact whether it is the use of a mobile messaging service that provides health tips and appointment reminders to servicemen with TBI or the dramatic VA Care Coordination and Home Telehealth project that demonstrated a 19 percent reduction in readmission for the same diagnosis and a 25 percent reduction in hospital days. These are real savings, true efficiencies in the system but most importantly, improvement in the lives of a precious resource, veterans and their families.

At the UVA Office of Telemedicine we are now engaged with corporate partners to use these everyday wireless capabilities to improve home monitoring for diabetic patients and engender an atmosphere to improve medication compliance, healthier lifestyles and the reduced use of emergency rooms for primary care. But access remains a critical issue. Imagine what we could have done for Shifty Powers, the Easy Company soldier from Clintwood, Virginia. Wireless capability would have perhaps helped him to feel less isolated, provided invaluable education for him and his family and reminded them of appointments. This combined with improved access in rural communities to telemedicine connection to specialty care is what is needed now.

I want to thank the Subcommittee and Committee as well as Congress for the steps they have already taken to enable this environment. But I also challenge Congress to engender an environment of investment by:

- Continuing funding of demonstration projects that use wireless to enhance home monitoring, health promotion and education;
- Ensuring health systems are incentivized to use wireless configurations;
- Encouraging professional education to incorporate training in these devices and applications;
- Providing for appropriate financial coverage for use of this capability;
- Promoting a standards-based environment for usage; and critically;
- Ensuring a Nation of seamless coverage without network fragmentation.

It has been stated that genetics and the tools of molecular medicine will provide a new golden age of medicine. While this is most certainly true, I contend it is wireless devices, telehealth applications and internet-based health software that are precipitating opportunities for improved health care for all veterans and for the Nation. Through this, we have the opportunity to get the basic right of prevention, access, education and ongoing care.

The hope is that these new, remarkable technologies, from smart-phones to EHRs to video-conferencing to sensor based health-monitoring devices, will empower patients, doctors and nurses to improve outcomes while cutting costs. For me, the ubiquitous presence of mobile phones is a major reason to think this world is now upon us. I strongly believe and hope this Committee is passionate that these capabilities are what will eliminate disparities in care for rural citizens, reduce the cost of care and stimulate remarkable new business models in the process.

As our Nation moves forward in restructuring its health care delivery system, the innovative uses of these telehealth tools will be an important driver of that change. With the adoption of favorable policies driven by Congress and innovation applied to the care of patients using integrated telehealth tools that includes wireless we stand at the threshold of eliminating disparities that have caused our rural veterans to suffer for far too long.

It is now time for us to stand up for those upon whom we depended for our health and freedom.

**Prepared Statement of William Cameron Powell, M.D., FACOG, President,
Chief Medical Officer and Co-Founder, AirStrip Technologies,
San Antonio, TX**

Remote patient monitoring of critical patient data via mobile devices (i.e., iPhone, Blackberry, etc) is rapidly becoming a necessary technology within the health care IT space in order to better care for patients and improve outcomes.

There are several reasons that patient monitoring with mobile devices is important. A few examples are as follows:

1. Doctors and nurses are mobile and the need for them to monitor more patients at different locations is growing.
2. There is an increasing shortage of health care providers relative to the increasing number of patients that need to be monitored either in the hospital, clinic or at home.
3. This shortage leads to a communication gap between caregivers.
4. The number one cause of patient injury in a hospital is communication errors between caregivers about a patient's condition.
5. There is now an expectation for real time, anywhere access to critical data.
6. The health care community needs to improve patient safety, reduce risk and improve communication as Federal regulation continues to drive technologies that improve outcomes.
7. Remote patient monitoring of real time data via mobile devices can close the communication gap, lead to better outcomes, improve patient safety and make the overall delivery of quality health care more affordable and more efficient.

There is a myriad of problems with the health care delivery system in the United States. One of the core problems facing health care professionals and the patients they serve is an increasing discrepancy between the number of patients that need to be monitored and the number of doctors, nurses and other health care providers that are available to monitor them.

In the United States, the number one cause of patient injury in a hospital is communication errors between caregivers. The demands of a doctor's or nurse's day necessitate their periodic absence from the patient care environment and it is during this time that communication errors can occur.

Doctors are often in surgery, covering patients at more than one hospital, making rounds, on call, at the office, at home and thus not at the bedside all the time. Nurses and hospitalists are often dealing with new patient admissions, managing patient discharges or engaged in other work related activities that preclude them from always being at the patient's bedside.

Within the hospital acute care environment, as in the Intensive Care Unit or in the Labor and Delivery unit, physicians and nurses rely on their ability to communicate about data that changes moment to moment. Much of the data that requires bi-directional communication involves visual data such as waveform data.

Waveform data is the moving line across a screen that provides a graphical representation of a heart tracing, an unborn baby's heart rhythm, a brain wave, a mother's contraction pattern or a host of other monitored data. Being able to visually interpret and describe changes in these waveforms helps a care provider who is remote to be able to effectively understand what is happening to that patient in real time as well as the recent past.

In this day and age of health care with such increasing demands on a doctor's or nurse's time, these health care providers are increasingly mobile. The health care system is burdened with solving the problem of effectively getting the right data about the right patient to the right health care provider to hopefully affect the right outcome.

Real time remote patient monitoring through the use of mobility has received a lot of attention lately because the focus on remote monitoring through a de-central-

ized model has become a reality via cutting edge technologies and breakthroughs across a wide swath of solutions from cell phones to wireless communications.

AirStrip's first product, AirStrip OB, is now installed in nearly 200 hospitals in the U.S. and there are several thousand physician users. AirStrip allows Obstetricians to view the real time fetal heart tracing, a mother's contraction pattern or other critical data via a mobile device (i.e. iPhone) anytime or anywhere. Given that up to 60 percent of adverse outcomes in Labor and Delivery are due to communication errors about the baby's heart tracing, providing this service to physicians when they are temporarily away from the bedside will result in fewer adverse outcomes, reduced patient injury and greatly improved physician and nursing workflow. AirStrip OB is the only known FDA cleared mobility solution of its kind.

AirStrip is also about to go to market with its next product line, AirStrip Critical Care and Cardiology. These solutions will provide physicians with real time remote access to critical waveforms, patient vitals, decision support information and a tremendous amount of other patient data that will help physicians better care for their patients and make more informed decisions when they are temporarily away from the hospital. These additional AirStrip products are currently pending FDA clearance.

Finally, AirStrip Technologies has developed a completely reusable and fully scaleable software development platform called AppPoint that can cut software development timelines by 80 percent and cost by 60 percent. AirStrip and soon AirStrip partners will use this platform to rapidly develop and bring to market an additional compelling suite of mobile applications that will allow health care providers to securely use mobile devices and cellular/wireless networks to provide real time remote patient monitoring service in virtually any environment.

The communication gap that currently exists between doctors and nurses that leads to patient injury can be closed through the use of remote patient monitoring solutions such as the AirStrip suite of mobile products.

Prepared Statement of Rick Cnossen, President and Chair, Board of Directors, Continua Health Alliance, and Director of Personal Health Enabling, Intel Corporation Digital Health Group, Hillsboro, OR

Good Morning Chairman Michaud, Ranking Member Brown and Distinguished Members of the House Committee on Veterans' Affairs, Subcommittee on Health.

My name is Rick Cnossen, President of the Continua Health Alliance, a non-profit, open industry coalition of health care and technology companies that are joined to collaborate and improve the quality of personal health care. On behalf of the members of Continua, I would like to thank you for the opportunity to present testimony on the important issue of bringing health care to our veterans.

Continua has 237 member companies from around the world that are dedicated to establishing a system of interoperable personal health solutions that fosters independence, empowers individuals and provides the opportunity for truly personalized health and wellness management. Continua is not a standards body—the Alliance selects existing commercially available standards and works to test and certify those standards so that personal telehealth solutions are interoperable, ubiquitous and contribute toward improved health management. Additionally, the Alliance writes guidelines on how to use those existing standards to achieve true interoperability across many companies and many devices.

I. Introduction to Personal Connected Health, Telehealth, and eCare

Continua uses the term "eCare" to refer to the class of health information technologies that can facilitate any kind of virtual visit or electronic connectivity outside of traditional office visits among patients, family members, and medical professionals. eCare includes personal connected health as well as telehealth. It can be secure text messaging between a senior patient and their doctor to change a medication dosage, an audio chat, or a full video web cam visit. It can also be personal connected health with an in-home or mobile broadband device that can help providers track and trend data like blood pressure and weight fluctuations that seniors and other patients can take by themselves on a regular basis. eCare may also include using connectivity to help patients remember to take a medication, capture a vital sign, or view customized content sent to them by their clinician to teach them about managing their own disease. eCare expands and extends the efforts of medical professionals by providing information to and from patients without geographic obstacles.

To realize the quality improvement and cost-containment goals of health care reform, our Nation must harness the benefits of technologies that allow patients and care providers to use real-world, remotely-collected data to make decisions about their health on a continual basis, rather than waiting until a condition has set in that requires them to schedule an urgent office visit or go to the emergency room. By tracking vital signs and other health data on a more regular basis and sharing it through secure systems, eCare offers many beneficial clinical capabilities:

- Empowers patients with tools that help them make sense of—and help manage—their own care;
- Collects real-world biological and behavioral data and trends on a regular basis with alerts for out-of-norm situations;
- Facilitates virtual visits with providers, whenever and wherever appropriate, via a range of electronic media;
- Enables social networking, awareness, and care support from family and friends who are nearby or distant;
- Personalizes care plans and educational content for each individual based on their needs, preferences, data, and capabilities; and
- Triages precious medical resources to enable the right amount of care to occur in the right place and time.

II. Successful Case Studies

These current services and future health information technologies will be the key to improving the delivery of clinical services and health care quality, as well as containing health care costs. Many studies have shown the value of personal connected health. For example, the New England Healthcare Institute (NEHI) “2008 Research Update, Remote Physiological Monitoring” found that remote patient monitoring resulted in a 60 percent reduction in hospital readmissions compared to standard care and a 50 percent reduction in hospital readmissions compared to disease management programs without monitoring. The same study found that remote patient monitoring has the potential to prevent between 460,000 and 627,000 heart failure related hospital readmissions each year. Based on this reduction in readmissions, NEHI estimated annual national cost savings of up to \$6.4 billion dollars.

As our Nation looks for ways to improve quality, access, and costs of health care, it is important to realize that eCare technologies can save lives and dollars. For example, the Department of Veterans Affairs (VA) examined this issue in its report, “Care Coordination/Home Telehealth: The Systemic Implementation of Health Informatics, Home Telehealth and DM to support the Coordination of Veteran Patients with Chronic Conditions.” The VA found that implementing telehealth to coordinate patient care led to a 25 percent reduction in the number of bed days and a 20 percent reduction in hospital admissions. The report showed a cost of \$1,600 per patient per annum for the telehealth program compared to \$13,121 for traditional primary care and \$77,745 for nursing home care. Not only were patients able to avoid readmission and improve their health status faster through telehealth services, but taxpayers also saved money.

III. Role of Personal Connected Health, Telehealth and eCare as Clinical Services and as Improving Health Care Quality in the Patient Protection and Affordability Act (PPACA)

eCare, including personal connected health and telehealth, complements clinic and hospital visits and improves health care quality. By monitoring their own data from home, patients and their caregivers become more engaged in self-care and aware of health trends. eCare can also improve consumers’ access to care, particularly in rural areas, by easing logistical burdens and reducing or eliminating the need to travel to a provider’s office for routine visits. In addition, through the use of personal connected health, providers have more information on a timely basis upon which to make medical decisions that can assist in addressing health problems before they become crises. As eCare removes geographical restrictions, patients will gain access to needed specialists who may not be local.

Recognizing these challenges and opportunities, the Patient Protection and Affordable Care Act (PPACA) includes numerous provisions designed to promote personal connected health, telehealth, and other eCare services. For example, the Secretary of HHS is required to develop guidelines for a payment structure that provides increased reimbursement or other incentives for: improving health outcomes through quality reports, case management, care coordination, chronic disease management, medication and care compliance initiatives (including medical home); activities to reduce hospital readmissions; activities to improve patient safety and reduce medical errors through the appropriate use of best clinical practices, evidence-based medi-

cine, and health information technology; and wellness and health promotion activities. eCare is at the crux of all of these services. (PPACA § 1311)

PPACA also recognizes that many meaningful physician encounters can occur remotely. Specifically, the Act allows certification or re-certification of a patient for home health services or durable medical equipment to occur through a face-to-face physician encounter or through the use of telehealth. (PPACA § 6407) In another example, a Medicare health risk assessment may be furnished through an interactive telephonic or web-based program that meets standards to be established by the Secretary of HHS. (PPACA § 4103) PPACA also provides for investment in community-based collaborative care networks that expand capacity through telehealth and medication management services that are provided either in-person or through telehealth technologies. (PPACA §§ 10333, 10328) These programs will both encourage the uptake of beneficial health information technologies throughout the health care system and address critical shortages of health care providers. Expanding the use of eCare will be paramount to providing high quality care for the increasing number of individuals who are living with chronic and expensive health conditions for longer than ever before. Without buy-in across government and private payers, the opportunities for eCare to enhance our health care system as recognized in PPACA will not be realized across our health care system.

Many of the most promising ideas for health care delivery innovation depend on eCare services. PPACA looks to increase the use of eCare services to provide for future improvement in health care delivery. For example, the Independence at Home Demonstration Project, designed to improve care for chronically ill Medicare beneficiaries, defines an “independence at home medical practice” as one that “uses electronic health information systems, remote monitoring, and mobile diagnostic technology.” (PPACA § 3024) Accountable Care Organizations participating in shared savings programs under PPACA are required to “define processes to promote evidence-based medicine and patient engagement, report on quality and cost measures, and coordinate care, such as through the use of telehealth, personal connected health, and other such enabling technologies.” (PPACA § 3022) Further, the Center for Medicare and Medicaid Innovation created by PPACA may test models that support care coordination through “a health information technology-enabled provider network that includes care coordinators, a chronic disease registry, and home telehealth technology,” and may consider whether a model under review “utilizes technology, such as electronic health records and patient-based remote monitoring systems, to coordinate care over time and across settings.” (PPACA § 3021) Without inclusion of eCare, from the beginning, as a clinical service or service that improves quality, our health care system will not benefit from or encourage the use of personal connected health or telehealth services. We urge policymakers to look to the future of what health care delivery can be through the use of wired, wireless, mobile broadband and whatever new forms of technology may appear to allow our uniquely American health care system to benefit from eCare as we know it and as we might know it in the future. eCare truly promises to be a disruptive approach that transforms the way that we provide health care and becomes an indispensable tool in the future.

Services that change patient behavior, assist in treatment and compliance, and improve quality are supported by information technologies. These technologies serve as the backbone for the provision of a variety of activities including wellness, disease management, medication management services and illness prevention—all important goals of PPACA. Over time, this infrastructure will need to be improved and augmented in order to support these activities particularly as these services become better integrated into our overall health care delivery system. As our reliance on information technology systems grows, they should also be considered a part of those services that improve quality. Without the vital services of eCare, our health care delivery system will be limited and not help move health care into the 21st century.

Technology is evolving rapidly. The rapid societal uptake of now-commonplace devices from smartphones, to netbooks, to smartbooks, demonstrates the pervasive role of mobile wireless technology in our daily lives and the opportunities they bring to improve our access to health care. As we learn and develop “best practices” for eCare—and invest in comparative effectiveness studies to know the right balance of in-home, in-clinic, and eCare consultations for different conditions and needs—these technologies will ultimately help us move beyond a quantity oriented system (e.g., number of visits done or tests or drugs prescribed) to one of quality.

IV. Continua Utilizes Voluntary Industry Interoperable Standards for eCare

Health care costs continue to spiral upwards to the point of prompting national mandates for change. Technology has advanced to a point where personal telehealth

systems provide viable, cost-effective solutions and represent a very real opportunity to help control costs. In order for deployment to become widespread, an ecosystem of standards-based interoperable components (starting with the consumer-facing device) is essential. The Continua Health Alliance was established to address this need. Technological advances, such as innovations in networking technologies and the rapid increase and availability of wireless internet-connected devices, enable the development of solutions that address user needs in a cost-effective manner. These technologies also allow people to remain safely in their own homes longer. Personal telehealth systems composed of an ecosystem of commercially available standards-based interoperable components are the building blocks of these solutions.¹

V. Need for Device Interoperability

While there are many challenges associated with the successful design, implementation and deployment of personal telehealth systems, one of the more obvious problems in early telehealth solutions has been the lack of device interoperability which requires broad industry support behind particular standards.

Integrator/Purchaser

Integrators (companies producing eCare solutions made up of components from a number of different vendors) and purchasers (health care providers that will be purchasing these solutions and offering them to their patients or members) both require a wide variety of system vendors and components to select from.

Interoperability is important as it allows integrators and purchasers to select from a wide variety of personal health devices offered by multiple vendors.

Product Designer

From the perspective of a product designer, device interoperability is essential. If the objective of the product designer is to design equipment that will communicate with a wide range of telehealth peripherals (for example, weight scales, blood pressure monitors, glucose meters), it is very likely that the desired set of peripherals be developed by multiple vendors. Interoperable solutions will minimize cost, improve design and development efficiencies and enable separation of concerns that device vendors can focus on devices, software vendors can focus on software development, and service providers can focus on service delivery by utilizing well-defined, unambiguous commercial standards and guidelines.

VI. Continua Solution

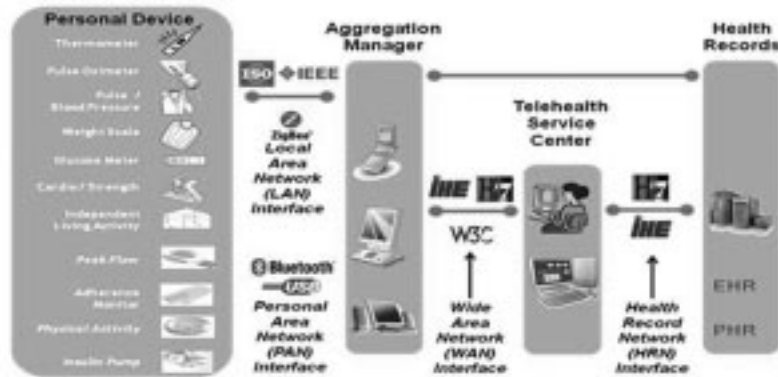
Approach

Continua Health Alliance was founded in 2006. The Alliance leveraged examples from other solution domains such as home networking (for example, Wi-Fi Alliance and Digital Living Network Alliance) in order to help define its overall approach. The result was the following methodology:

- Select existing, applicable industry standards
- Extend these selected standards where required (to meet user needs identified in use cases and requirements)
- Eliminate ambiguity in interpretation of these standards through a collection of interoperability guidelines
- Develop a certification process that guarantees products meet the guidelines and provide the consumer a high-quality user experience

Continua put in place a flexible architecture that allows for a common approach but also accommodates regulated and unregulated products from the various application domains. The figure below shows the various components and the interfaces that constitute an end-to-end solution.

¹www.ContinuaAlliance.org



VII. Recommendations for eCare integration

Despite the success Continua members have achieved in developing devices and services as assistive technologies for patients with chronic disease and succeeded in making sure that these devices interoperate, significant barriers restrict the integration of eCare into patient care plans. In order to ensure that patients and clinicians have full access for their optimum health care, we respectfully submit the following recommendations:

1. Establish a Federal Organization Focused on eCare:

The U.S. Congress realized the benefits of eCare by including references to technologies for personal connected health in more than 20 provisions in Patient Protection and Accountable Care Act (PPACA). However, we find that Federal agencies may lack a coordinated approach to unlocking the potential of these powerful, cost efficient and life saving technologies. In order to maximize information sharing on an interagency basis, we urge the U.S. Government to consider the establishment of an "Office of eCare". Much like the Office of the National Coordinator for Health Information Technologies was formed in 2004 through an Executive Order to accelerate the use of health IT, the expansion of eCare across various care delivery models is a timely and fruitful objective.

2. Payment Reform for eCare

As noted in the Federal Communications Commission National Broadband Plan, reimbursement reforms are essential to incentivize the meaningful use and widespread adoption of eCare technologies. Simply stated, reimbursement issues are a barrier to the adoption of health IT. The Centers for Medicare and Medicaid Services (CMS) define telehealth services as the use of medical information exchanged from one site to another via electronic communications to improve a patient's health.² Electronic communication means the use of interactive telecommunications equipment that includes, at minimum, audio and video equipment permitting two-way, real-time (with limited exceptions) interactive communication between the patient, and the physician or practitioner at the distant site. The definition includes limitations on the types of originating sites of care that can be used, in addition to the requirement that an originating site must be located in either a health professional shortage area (HPSA) or in a county not classified as a metropolitan statistical area (MSA).

eCare reimbursement should be permitted everywhere and at anytime and not limited to geographically rural areas. The limitations on which types of originating institutions and which fields of health care are eligible for telehealth reimbursement are outdated. Health care management should not be limited to only live encounters, where store-and-forward technologies are perfectly capable of providing reliable, consistent, diagnostic care. Interoperable personal telehealth and remote monitoring of data can be used for disease management, safety, health and wellness. If

²See Centers for Medicare and Medicaid Services, "Telemedicine and Telehealth," <http://www.cms.hhs.gov/Telemedicine/>.

a Medicare benefit plan covers a service, then that plan should also cover the same service when it is performed via eCare.

3. Establish Blueprints for the use of eCare in States and communities.

We can learn from the successful deployment of 35,000 chronic care patients served by remote patient monitoring through the Department of Veterans Affairs. Although a closed system, the results are for patients with the same illnesses that Americans across the Nation face. We need to do the hard work of factoring new payment plans, work flow systems and efficiently using community resources to care for our patients at home. We offer the resources of the Continua Health Alliance to convene the appropriate participants—hospital systems, doctors, technology companies to work with Congress and HHS to design a system that works for all stakeholders.

4. Incorporate eCare as part of “meaningful use”.

The significant investments in health information technology (HIT infrastructure made through the American Recovery and Reinvestment Act (ARRA) and health care reform are an important starting place for improving our country’s capacity to provide high quality and efficient care. Without a national infrastructure—an “electronic highway” for health information—it will be impossible for the United States to deliver quality care to more people at lower costs as the Nation ages. With the passage of AARA, our Nation took a leap forward in relation to electronic health records (EHRs) by allocating \$19.2 billion towards the adoption of HIT. That investment is just one step. eCare is the next step forward, and without its inclusion in the “Meaningful Use” requirements, the significant dollar investment made by the Federal Government stops short of moving the system beyond just the use of records. eCare can populate electronic medical records with trend data and other timely information to provide a more complete picture of a patient and to empower providers to make clinical decisions that improve the health and lives of Americans. We urge HHS to ensure that a mechanism is in place to allow Personal Health summaries to be integrated into EHRs in a standard fashion (e.g., Continua’s Health Record Network standard).

5. Make home broadband adoption for all Americans a top priority following recommendations in the FCC’s National Broadband Plan.

Extending broadband adoption is especially important in rural parts of the country to enable new independent living and home health care solutions. Similar to the National Broadband Plan, Continua supports the FCC’s notion that a Health Care Broadband Infrastructure Fund should be established to subsidize fixed, wireless and mobile network deployments to augment health care delivery in locations where existing networks are insufficient.

VIII. Future Vision of what eCare can deliver

In 2005, the Center for Aging Technologies (CAST), developed *Imagine—the Future of Aging*. Rather than describe what the future could be, I invite you to watch the video which will give you a glimpse, through the eyes of one family, of what the future could look like with help from developing technologies that are possible, practical, affordable and ethical. You will also see how these technologies have the potential to improve care, preserve independence, and ensure quality of life while reducing costs.

We must, however, take action through vision, leadership and national commitment to prepare for the demographic and economic changes that will inevitably transform health care.

<http://www.youtube.com/watch?v=SBH9dkCZsXQ>.



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**Prepared Statement of Kent E. Dicks, Founder and Chief Executive Officer,
MedApps, Inc., Scottsdale, AZ**

Good Morning Chairman Michaud, Ranking Member Brown and Distinguished Members of the House Committee on Veterans' Affairs, Subcommittee on Health.

My name is Kent Dicks, Founder and CEO of MedApps, a small business enterprise located in Scottsdale, Arizona. On behalf of the Team at MedApps and the veteran-owned enterprise that manufactures our devices here in America, I would like to thank you for the opportunity to present this testimony.

We are here today to speak about overcoming rural health care barriers through the use of innovative wireless health technology solutions. I am here today to speak about innovative digital wireless communications technologies, like those produced by my company MedApps, which are quickly becoming a key component in the delivery of health care and services across America, via Wireless Remote Patient Monitoring.

Medical devices, health sensors and their applications rely upon mobile broadband functionality and interoperability to transmit raw data, diagnostic health information, critical aspects of care, emergency services and related health information. These services are at the forefront of a revolution in the provision and delivery of health care in America; a revolution which collapses time, space and distance to more effectively monitor patients, develop analytical trends, maximize strained medical resources and save lives.

First, a word on the nomenclature surrounding wireless health. There are many terms loosely used today to describe the differing and often confusing aspects of wireless health information technologies. Terms such as mHealth, e-Health, telehealth and telemedicine are but a few of many descriptive names being used in the wireless health space. Some terms have industry meaning, others are regulatory terms with strict Federal definitions and criteria.

For purposes of today's hearing I will use the term "eCare", which is the term used by the Federal Communications Commission in Chapter 10 of the National Broadband Plan for America.¹ eCare is the electronic exchange of information—electronic data, images and video—to aid in the practice of medicine and health care analytics. eCare encompasses technologies that enable remote monitoring or "store-and-forward" transmissions over wireless fixed or mobile networks. eCare is not a substitute for health care providers, physicians or clinicians—it is intended to augment the good work of medical professionals and improve patient care by making

¹ See: FCC National Broadband Plan: Connecting America, released March 16, 2010, at Page 200. See U.S. Senate Special Committee on Aging, Committee Hearing on April 22, 2010 "Aging in Place: The National Broadband Plan and Bringing Health Care Technology Home" http://aging.senate.gov/hearing_detail.cfm?id=324102&.

important information available to patients, their loved ones and care providers anywhere, at anytime.

In a landmark comprehensive pilot with 17,000 veterans, the Department of Veterans Affairs demonstrated that by implementing remote patient monitoring they experienced a reduction in hospitalization by 25 percent and an average cost of \$1,600 per patient per year for remote monitoring compared to annual costs of \$13,121 per patient for primary care and \$77,745 per patient for nursing home care.

Amazingly, those encouraging results and statistics were achieved with first generation of wired systems that are typically more costly, proprietary and are tethered to a point of care, lacking mobility. If the pilot program was able to achieve those encouraging results for patients using this technology, imagine the potential wireless eCare technologies would hold?

eCare technologies like wireless mobile solutions drive down costs and improve care by closely monitoring patients wherever they may be. Thus, they allow health care to be practiced in a more “Proactive” manner, rather than in a “Reactive” manner, and can possibly head off a patient going to the emergency room or hospital setting in the first place.

In my hand is an example of the technology that I am talking about. This is called the HealthPAL. The HealthPAL’s sole purpose is to allow a patient to stay connected with their “Electronic Health Record” and ultimately their caregiver. The HealthPAL is FDA cleared and communicates wirelessly (or wired) with other medical devices designed for use outside the hospital, such as this Nonin 9560 Pulse Oximeter.

A doctor may ask a veteran with chronic obstructive pulmonary disease or congestive heart failure to take a reading once a day in order to make sure that they are staying within the safe zones. And as you can see, the Pulse Oximeter reading went over automatically to the HealthPAL without the patient having to press any buttons whatsoever (hands off), using Bluetooth wireless technology. It’s that simple.

The HealthPAL, like the one that I am holding in my hand, has mobile phone technology embedded into it directly, using a technology called “Machine 2 Machine” (M2M). This 3G mobile broadband chipset by Qualcomm is about the size of a U.S. quarter, which is embedded in the HealthPAL, and is the key to connecting our Veterans to their health care providers, in an efficient and economical manner.

You will be hearing a lot about M2M services and mobile chipsets in the near future, in relation to health care and smart grid technologies, in particular. Mobile chipset powered modules allow us to connect ubiquitously to cellular and mobile broadband networks throughout the U.S., and globally. According to the Federal Communications Commission nearly 96 percent of the U.S. population is covered by a mobile broadband network and 99 percent of the non-rural U.S. population and nearly 83 percent of the rural U.S. population is so covered.² At the heart of science, medicine, energy and engineering, mobile wireless and broadband technologies are reliably and invisibly working in the background on economical rate plans.

Innovative technologies like the HealthPAL are targeted towards 10 percent of the population that consume 70 percent of the health care resources; the sickest of the sick. Often this population is older, and does not have access to “state of the art” technology or Internet access.

The HealthPAL works as an agnostic hub or central device that connects to various medical devices and sensors and then transmits their data to a secure central server. The HealthPAL comes packaged together, including mobile wireless connectivity straight out of the box and ready to use. Nothing complicated to setup, provide or maintain—everything is done remotely, including software upgrades, much like popular “Kindle™”,³ e-reading devices.

Let me be clear about what we are trying to achieve in using “off the shelf” devices and mobile wireless technology. It is not to over engineer a gadget for the sake of fancy bells and whistles. Rather, it is about creating a sense of accountability and reliability between the patient and the caregiver, at the lowest cost possible. If a

² See: *Bringing Broadband to Rural America, Report on a Rural Broadband Strategy*, released May 22, 2009, at Pgs. 12–13. In making that finding, the Commission defined networks based on EV-DO and WCDMA/HSPA as constituting mobile broadband. The Commission used the same definition of mobile broadband in its annual reports on the state of competition in the U.S. wireless market in 2009, 2008, and 2007. See *Thirteenth Report, Annual Report and Analysis of Competitive Market Conditions with Respect to Commercial Mobile Services*, WT Docket No. 08–27, DA 09–54, released January 16, 2009 at Pgs. 69, 73–74; *Twelfth Report, Annual Report and Analysis of Competitive Market Conditions with Respect to Commercial Mobile Services*, WT Docket No. 07–71, released Feb. 4, 2008, at Pgs. 8, 68–69; *Eleventh Report, Annual Report and Analysis of Competitive Market Conditions with Respect to Commercial Mobile Services*, WT Docket No. 06–17, released Sept. 29, 2006, at Pg. 54.

³ See: <http://www.amazon.com/dp/B0015T963C>.

patient is “connected” and accountable, then they are more likely to follow their doctor’s instructions, take their readings, take their medication, and thus stay out of the hospital.

The MedApps solution is used in a variety of ways, by everyday people including David Jesse, a Truck Driver from Rural Ohio. David’s erratic schedule makes it difficult to set up and keep appointments with his doctor—and his health suffered because of it. David often had to produce log books to take back to his doctor at the Cleveland Clinic every couple of months and his doctor attempted to adjust his medication based on dated information. Today David uses the HealthPAL in the cab of his truck, and has taken his readings throughout 47 States. This technology has allowed David to substantially improve his health and need for medication. He no longer has to drive back to Ohio every 2 months to be checked by his doctor, who along with David’s wife can stay connected to him remotely while he’s on the road, making sure he is ok and his medical conditions stay under control.

At Meridian Health, a NJ based Health system, the technology is being used to help reduce re-admissions of congestive heart failure patients (“CHF”). Typically across the country, 27 percent of congestive heart failure patients are readmitted within 30 days with the same condition. An average CHF hospitalization is about \$8,000. At Meridian Health, the HealthPAL and a wireless scale are provided to a CHF patient upon discharge to monitor the patient for thirty days to ensure patients with signs of worsening conditions are seen by their physician for early, less resource intensive interventions. The equipment is returned to Meridian at the end of the 30-day period. So far, out of 30 patients, Meridian has experienced no re-admissions due to heart failure within the 30-day period.

eCare made this possible—today. The examination room of the future will be wherever the patient is located. Underserved patients are not just those typically found in rural America or in geographic areas of low population density, but can be anywhere our Veterans live. Now with an aging baby boomer demographic, more people will continue to place greater demands on the Nation’s health care infrastructure everywhere. We need to provide the tools to help absorb those demands and make the provision of care available everywhere and at any time.

In conclusion, the VA could potentially extend its capacity for remote monitoring on a daily basis from 35,000 patients currently, to over 100,000 patients by utilizing innovative mobile enabled medical technologies.

Wireless mobile technology is a solution that is available today. Robust mobile networks exist to start bringing care to those who so desperately need and, in fact, deserve it, no matter where they live. The VA and U.S. tax payers would save a significant amount of time, money and natural resources by using mobile wireless enabled medical technology.

Mr. Chairman, this concludes my prepared statement. I would like to extend an invitation to you and the distinguished members of the House Committee on Veterans’ Affairs, Subcommittee on Health to observe a demonstration of this technology at a future time. I would be pleased to answer any questions you may have and on behalf of the team at MedApps, I thank you for the opportunity to discuss these issues with you today.

**Prepared Statement of Huy Nguyen, M.D., Chief Executive Officer,
Cogon Systems, Inc., Pensacola, FL**

Background

Thank you for the opportunity to testify before the Subcommittee on Health of the House Committee on Veterans Affairs. My name is Dr. Huy Nguyen. I am a Navy veteran who served in Iraq in 2003 as a physician attached to Fleet Hospital Pensacola. During that tumultuous period, I saw up close and personal the cost of war and the utmost sacrifices that our veterans make in service of their county. I have since separated from active duty; however, I continue to serve our military and veteran community presently as a civilian Emergency Department physician at my cherished Naval Hospital Pensacola. In addition to being a military-affiliated provider, I am also the Founder and Chief Executive Officer of Cogon Systems. Our mission at Cogon is to facilitate Connected, Value-Driven Health care. We achieve this by facilitating secure web-based health information solutions leveraging ‘cloud computing’ technology. My personal interest in health care mobile technology and clinical information systems dates back to my years as a medical student and was developed further as a naval physician utilizing the military’s electronic health record.

This hearing is broadly intended to examine how the Nation can utilize new and innovative wireless technologies to expand access and quality of care for veterans in remote areas. In my testimony today, I will certainly discuss my company's experience with mobile health care technology and how it can impact veteran care. However, I would like to begin my testimony by discussing health information exchange and interoperability which complements mobile technology by allowing comprehensive health information available to be accessible to mobile devices. Secure mobile access to comprehensive health information can be particularly helpful to providers and veteran patients in rural communities.

In discussing the potential of health information exchange, I will draw on my company's project in Pensacola which has facilitated the largest instance of secure data sharing between Federal and civilian health care providers. I believe that this project is in keeping with the spirit and intent of the Obama Administration's Virtual Electronic Health Record (VLER) efforts. Finally, I would like to discuss some innovative ideas that can empower our veterans in rural communities to assume greater ownership of their health.

The Department of Veterans Affairs' Stated Objectives and Mandates

As context to today's testimony, I would like to highlight some significant objectives that guide Cogon's desire to facilitate better care for veterans and in the process be a beacon for the greater civilian health care community.

The Department of Defense Military Health System (MHS) and Veterans Administration (VA) are promoting the VLER initiative which represents the first iteration of a new national capability to securely share electronic health and administrative information. In order to ensure a seamless transition of health services from one agency to another, MHS and the VA are implementing these critical elements:

- a full understanding of medical care capabilities within both agencies by all medical providers involved,
- clear communications of the transition plan between providers in each agency and with the patient and patient's family,
- timely transfer of all pertinent medical records before or at the time of transfer of the patient, and
- ongoing communication after the transfer of the patient between the medical providers in each agency and with the patient and patient's family.

On April 9, 2009, President Obama directed the Department of Defense and the Department of Veterans Affairs to create the Virtual Lifetime Electronic Record:

“ . . . will ultimately contain administrative and medical information from the day an individual enters military service throughout their military career and after they leave the military.”

In light of the fact that 3 out of 4 Veterans receive a portion of their care from a civilian private sector provider, President Obama has also stated it is important to:

Allow health care providers access to servicemembers' and Veterans' health records, in a secure and authorized way, regardless of whether care is delivered in the private sector, Department of Defense, or VA

The MHS and VA have been pioneers in adopting electronic health records well before their civilian providers. Therefore, in my humble opinion, the VLER initiative is an ambitious and natural progression of the investments that the MHS and VA have made in the realm of digital health care. Furthermore, the VLER initiative can shed light to the greater health care community's efforts to share health information via the Nationwide Health Information Network (NHIN). The question here today then is can the MHS and VA leverage its past and current focus on health information technology to translate into better care for our military personnel and veterans especially in underserved communities.

As an example, the VA has stated that it has decreased unnecessary hospitalizations through a wide-ranging effort to help veterans manage chronic conditions at home.^{1,2} Hospital use decreased 25 percent overall and 50 percent for patients in highly rural areas by linking 32,000 chronically ill veterans with health care pro-

¹Jia H, et al. “Long-Term Effect of Home Telehealth Services in Preventable Hospitalization Use,” *Journal of Rehabilitation Research and Development* 46, no. 5 (2008): 557–566.

²Darkins A, et al. “Care Coordination/Home Telehealth” *The Systematic Implementation of Health Informatics, Home Telehealth, and Disease Management to Support the Care of Veteran Patients with Chronic Conditions,* *Telemedicine and e-Health*, 14, no. 10 (2008): 1118–1126.

viders and care managers through video phones, digital cameras, and messaging and telemonitoring. This is an example of how the VA's investment in an electronic health record can 'springboard' better patient care and cost savings.

In FY 2006 an estimated 8.3 percent of the populations are Veterans. The Veteran enrollee population was about 7.8 million. About 38 percent of such enrollees live in rural or highly rural areas.³ In these rural communities, access to a VA care facility is logistically and often financially challenging for most of these veterans. As I see it, our veterans have often gone to isolated places to serve us, so now it is imperative that we find means to serve them wherever they may reside. I believe that technology coupled with the internet and increasing digital broadband will allow for innovative means such as the example above to provide care in the rural communities.

Health Information Exchange as the System Behind Access to Information to Help Veterans Care and Drive Mobile Technology

Cogon's health information exchange is designed to (1) ensure first and foremost electronic security; (2) facilitate data interoperability from disparate systems; (3) handle network scalability as required by the Nationwide Health Information Network (NHIN); and to facilitate other applications and innovations. The **VIRTUAL HEALTH NETWORK**[®] (VHN) is Cogon Systems, Inc. (Cogon) underlying software platform. The platform integrates with providers such as hospital's existing information systems. The VHN is agnostic toward specific types of electronic health records software. The VHN is not meant to replace electronic health records but as an augmenting data broker that will find, compile, and present this data to caregivers in a manner that will allow them to make the best decisions possible at the moment of care.

Furthermore, the VHN was designed to leverage 'cloud computing' so that providers do not have to make any capital investment such as buying unnecessary hardware and incurring significant software licensing. It is Cogon's focus to utilize the internet coupled to a utility business model to lay a foundation of flexibility and sustainability that we believe is critical for provider adoption. Health information exchange (HIE) provides for the sharing of clinical and administrative data across the boundaries of health care institutions, health data repositories, and States. The full potential is going to take time and multiple-steps to achieve.

Health information exchange includes core fundamentals such as participation, connectivity, data use agreements, privacy and security, record location, basic functionality, and return on investment. Our proposal for a sustainable model starts by focusing on these issues. For the next decade we need systems where institutions at different levels of sophistication may participate, be connected and have sustainable arrangement for sharing data where there is a business advantage. These institutions such as rural hospitals will migrate to more sophisticated systems such as disease management on time frames related to their circumstances and return on investment. With health information technology (HIT), we should never let perfection be the enemy of good.

Providers have significant HIT issues to consider over at least 5 to 10 years: meaningful use requirements, new privacy and security rules, updating billing and coding standards for transactions, dozens of new reporting and operational requirements, new technologies, changes in practice, new pressure to control costs, changes that flow from health care reform changes to the insurance market, evidence based medicine, personalized medicine, and more. There is a lot of uncertainty over how these issues will roll out. There are regulations, penalties, and financial risks from any investment. It is important to allow providers to participate at the level in exchange at the level that fits their schedule. This approach is in keeping with our continued belief that health care should adhere to market forces as an impetus to innovation and better care.

The Pensacola Model: Strategic Health Intelligence

The health information exchange (THIE) project in Pensacola to facilitate the sharing of health information between military and civilian providers was a congressionally-funded project. The basis of congressional support for this endeavor is due to the fact that by some estimates, more than 60 percent of health care delivered to DoD beneficiaries is provided by private sector health care providers. Those providers are unable to access information regarding a patient's health status or care episodes from the MHS' electronic health/medical record systems. Similarly, patient visits to private sector health care providers which capture an enormous amount of

³Presentation of Adam Darkins, Veterans Health Administration Presentation at the Second National Rural Health Information Technology Conference, September 12-14, 2007.

information regarding care, health and readiness are not available to MHS providers. This is the reality of patient care in MTF communities across the country.

The project is fiscally managed by the MHS' Telemedicine and Advanced Technology Research Center (TATRC) that successfully tested the concept of exchanging protected health information between Naval Hospital Pensacola and private sector health care providers in Pensacola using DoD/VHA Bi-Directional Health Information Exchange (BHIE) interfaced to Cogon Systems' Virtual Health Network. The following data set can currently be accessed transiently by military and civilian providers via Web services: C32 Patient Summary, patient demographics, diagnoses/problem list, providers, allergies, medications, laboratory results, radiology results and clinical notes. This is the reality of patient care in Pensacola today. To date, more than 30,000 patient records concerning patients jointly seen by the MHS and Pensacola civilian providers can be shared. This data exchange is in compliance with the Data Use Agreement between our company and the MHS' TRICARE Management Activity office.

At the onset of the project, TATRC made it clear that there was no sustainment budget for this project regardless of its success. In looking at the sustainment of this project, we felt that a utility business model that allowed civilian and Federal providers to cost share this project was the most market-based approach. Among civilian providers, we also had to contend with the sensitivity of a highly competitive environment where a common-value proposition may be a tough sell. Therefore, critical to a successful utility was the need for a trusted community broker that could govern and manage the utility. In our community, the Pensacola Bay Chamber of Commerce fit the profile of a neutral entity that could 'cut through the clutter.' Under the auspices of the Pensacola Bay Chamber of Commerce, an organization called Strategic Health Intelligence has been established to manage the Federal-civilian health information utility (HIU).

Pensacola/Escambia County is now one of the advanced digital health care communities in America. Pensacola pioneered shared governance involving Federal and civilian providers across the entire community for its health information exchange. Furthermore, the Health information utility (HIU) business model is a template for sustaining shared costs between Federal and competing civilian providers to effect "game changing" community-wide clinical decision support. The HIU is the first and largest instance of operational data sharing between civilian and Federal providers to date. Pensacola/Escambia County also has a high rate of electronic health records (EHR) adoption (>40 percent).

The Florida Gulf Coast boasts a large contingency of active duty and retired military. Escambia County is fortunate to have not only the Naval Hospital Pensacola, but also a VA Joint Ambulatory Care Clinic. Both facilities are not only supportive of this application, they also play a significant role in the Chamber's HIU and are board members of the Strategic Health Intelligence, LLC.

The Chamber's health information utility (HIU) has a successful track record in connecting and exchanging health data between civilian and Federal Government networks. Initiated in 2008, the Chamber's HIU has facilitated the largest instance of data sharing between Federal and civilian providers by integrating 300,000+ unique civilian patient records from local hospitals and correlating those records with over 23,000+ unique Federal records from the current health information exchange (HIE) between the DoD and VA. With demonstrable market penetration the Chamber is operating one of the largest sustained HIE systems in existence to date. This system is currently the largest operation connecting military data to civilian providers and demonstrating success and lessons learned can directly contribute to business and technologies in the emerging Virtual Lifetime Electronic Record/Nationwide Health Information Network (VLER/NHIN) pilot projects such as Phase 1a. The VA has a highly adopted electronic health record, VistA, and an advanced personal health record (MyHealth-Vet). However, to assure appropriate transitions of care as noted by President Obama, the VA and MHS' electronic health records must be interoperate with civilian providers'. As I have mentioned we are exchanging data in Pensacola with the MHS under a data use agreement. This exchange is with the Bidirectional Health Information Exchange (BHIE) program that connects MHS and the VA. Though the BHIE is not yet want to include the VA in the exchange so we can help veterans make sure their transitions of care are coordinated. Right now less than 20 percent private providers have adopted EHR's. This does not have to be an impediment to all exchange. If we make hospital, VA and DoD information available to providers via the web, this helps transitions of care.

In moving forward, we plan on transitioning to the National Health Information Network (NHIN) and to a sustainment model for health information exchange as a public utility under the auspices of Pensacola Chamber of Commerce. As we embark on health information exchange, we need to remember that the perfect is the

enemy of the good. Community-wide health information exchange between civilian and military health care providers is a good place to start. And a market-based approach to cost sharing is the key to long term sustainment of VLER-like communities.

Mobile Technology As a Value-Added Adjunct

In addition to our experience with health information exchange involving Federal providers, we are also under contract with TATRC to deploy a next-generation mobile solutions so that military providers at Madigan can access critical health information securely on the latest mobile devices over wide-area cellular network. I absolutely believe that over the next 10 years, mobile technology will undergo the seismic changes that we have experienced over the past 20 years with desktop/laptop computing. With increased mobile bandwidth coupled to greater computing power coupled to pervasive communication media (voice, email, text, video, etc.), the days of Dick Tracy's video watch is not far off. Since health care involves inherently a mobile workflow, I am excited as a physician and technologist how mobile technology will transform the practice of care. Finally, I am also excited about how mobile technology in conjunction with health care data interoperability will empower our patients and veterans to assume true ownership of their care and health. I think that mobile technology can send alerts to our patients to make appropriate follow-ups, refill medications, and interface with their providers in virtual manners that will decrease the burden on our emergency rooms and medical practices while potentially keeping them out of expensive hospitalizations.

Transitions of Care for Wounded Warriors and Broadening Health Information Technology Incentives

On the issue utilizing health information and mobile technology to provide better, comprehensive care for our veterans, I would like to highlight an issue of incentives for ancillary providers, who play critical roles in the holistic care of our wounded warriors. In consideration of transitions of care for returning wounded warriors, the 2007 Report of the President's Commission on Care for America's Returning Wounded Warriors notes:

. . . Injured servicemembers receive clinical care in many settings. It may be provided in military hospital inpatient units and outpatient departments, in the private practices of physicians and mental health care professionals, and in various physical rehabilitation programs connected with the hospital, the nearby community, the VA, or back home in their own communities. They also are eligible for numerous education, training, and employment programs that, although not clinical, depend for their effectiveness on servicemembers' level of physical and mental functioning. . .

. . . With our proposed comprehensive Recovery Plan, patient records would need to be electronically available to the Recovery Coordinator, health care professionals, and program staff across the continuum—from acute care, to rehabilitation, to long-term support, education, and employment programs, if needed. The system must be secure and designed so that various professionals have access to the information germane to their work. . .

This means groups that provide orthotics and prosthetics, physical therapists, psychologists and more need to be part of the continuum of care with respect to electronic records and exchange. By leaving key groups out of incentives we are not only failing the recommendations of the Commission but delaying the day when full coordination across the continuum of care will apply.

Unfortunately, the ARRA funding for health information technology adoption left these critical groups out. The exclusion of these groups from the HIT puts care coordination and exchange even further behind. Cogon and Pensacola are focusing on the transitions of care between military and civilian providers. Wounded warriors are a particularly important use case to promote and we look to Congress to assist with this effort. Again, by leaving key groups out of the incentives programs, we are undermining this vision and ignoring critical stakeholders in VLER communities.

Challenges for Rural Communities

According to the National Rural Health Policy Institute challenges for rural communities include:⁴

- Patients may be isolated, must travel long distances or are homebound; Access is a major problem
- Rural residents and minorities may be older, and often with certain chronic conditions
- Cultural and Language Barriers
- Low patient volume
- Longer wait times for Care
- Disjointed care; Lower quality of care
- Lower income, and less private insurance
- Many are Less Likely to Own or Use Computers
- Limited (but growing) Use of Internet
- Underserved Health care Providers may have no IT support let alone an IT Department; HIT Worker Shortages
- Hard to find M.D. or Admin. leaders/Change agents
- Other business priorities i.e. “surviving”
- No business case for connectivity/linkages to other institutions
- No aggregate buying power (hence pooled vendor selection processes & need for Networking)
- Need to address critical referral pattern issues, disruptions, patient flows etc.

These are all very significant that I believe highlights the need for web-based health information technology and mobile technology to help mitigate issues. Obviously, web-based exchange needs broad-band access, and I believe that the Federal Communications Commission is making significant investments to address rural broad-band. It must be noted that in Pensacola, the Chamber is also the lead agency in rolling out the Lambda Rail, which provides large bandwidth via a fiberoptic cable. Web-based software as a service in conjunction with broadband access will allow for ‘cloud computing’ offerings that will lower the barriers for rural communities to implement leading-edge approaches to better physical and mental health care. Below are some approaches that I believe could be championed by the VA in rural communities:

1. Social Networking—Modern health care is an inherent social network with the patient/veteran at its core. So some of the concept of Facebook™ and other social sites can be adopted to bring a level of transparency that will allow for multiple providers to better coordinate the complex, remote care of veterans in rural communities. Furthermore, I believe that social networking can be a means for veterans to support themselves as ‘brothers in arms’ in their transition to civilian life.
2. Interactive Mobile Personal Health Records—Personal Health Records (PHR) including My HealtheVet have had challenges of adoption by patients. At Cogon, we are working toward a mobile approach to PHR that will interact with patients via cell phones. We believe that health information needs to be available to the patients wherever and whenever they may be. And the same mobile mechanism can be utilized to reinforce specific care goals such as medication compliance via alerts and text messaging.
3. Care and Referral Management—The sustained care of wounded warriors often entails a coordinated complex care management scheme involving military, VA, and civilian providers. The coordination of care can be better automated and tracked,
4. Tele-medicine—Access to the cumulative record of veterans in rural communities will facilitate for veterans to make more ‘virtual’ visits to providers such as specialists.
5. Disease Management—As more health information becomes integrated and standardized, it will allow for the greater use of sophisticated analytics tools to maximize patient care.

Summation

As a physician and a veteran, I would like to thank this Committee for allowing me the opportunity to testify on a subject that is personally dear to me—the care of veterans. I believe that VA in conjunction with the MHS has an enormous opportunity and responsibility to maximize its leadership in health information tech-

⁴Presentation of Neal Neuberger, Executive Director, National Rural Health Association, Rural Health Policy Institute before the Institute for eHealth Policy, January 25, 2010.

nology in order to take care of our veterans. We hope the Subcommittee will support efforts to add exchange with the VA to our current civilian-DoD exchange efforts in Pensacola to improve veterans care.

Prepared Statement of Dan Frank, Managing Partner, Three Wire Systems, LLC, Vienna, VA, Also on behalf of MHN, A Health Net Company, San Rafael, CA, on the VetAdvisor® Support Program

Mr. Chairman and distinguished Members of the Committee, we are grateful for the opportunity to provide testimony on Overcoming Rural Health Care Barriers: Use of Innovative Wireless Health Technology Solutions. My name is Dan Frank and I am the Managing Partner of Three Wire Systems, LLC (Three Wire). I am joined by my colleague, Dr. Ian Shaffer. Dr. Shaffer is the Chief Medical Officer for MHN. Three Wire is the prime contractor and MHN provides clinical support for the VetAdvisor® Support Program which is the topic of our testimony.

We will provide an overview and results to date of the VetAdvisor Support Program (VetAdvisor), an innovative evidence-based program that provides mental health outreach and health coaching services to Operation Enduring Freedom and Operation Iraqi Freedom (OEF/OIF) Veterans and their families, in both urban and rural areas. VetAdvisor uses non-traditional telehealth/virtual health delivery platforms to reach out to, and improve Veteran awareness of, and access to, the mental health support for which they are eligible.

What Is VetAdvisor?:

Telehealth is the underpinning of this ongoing program to ensure Veterans who have enrolled in VA and who may have mental health issues do not fall through the cracks. VetAdvisor is a two-part program—sponsored during the past 3 years by Veterans Integrated Service Network (VISN) 12, which augments and supports existing VA behavioral health care services, and assists Veterans with challenges they face during reintegration into civilian life. Using a call center that makes outgoing calls to conduct VA-approved behavioral health screenings, VetAdvisor identifies and refers to VA Veterans who may be in need of clinical behavioral health assistance. In addition, health coaching is a newer component of the program, which provides Veterans with an opportunity to participate in individual or group health coaching sessions using a virtual room on a computer, or by phone, if the computer is not an option. For example, a Veteran may work with a health coach on issues such as tobacco cessation, weight management, or understanding Post Traumatic Stress Disorder (PTSD) management.

VetAdvisor assists Veterans and their families, providing complementary, non-clinical support to Veterans identified and referred to the program by VA. Telehealth platforms allow enrolled OIF/OEF Veterans to stay connected and focus on areas of concern to them without leaving their homes. VetAdvisor's trained health coaches (i.e., Licensed Clinical Social Workers) who conduct these sessions are critical to the popularity and growing success of this innovative VISN 12 initiative.

VetAdvisor, as an extender of VA face-to-face clinical services, focuses on identifying and working with Veterans who have, or are at risk for, PTSD, depression, substance abuse, suicide and homelessness. This telehealth approach to outreach, screening and coaching helps eliminate the stigma Veterans often associate with seeking mental health services and assists them in getting treatment.

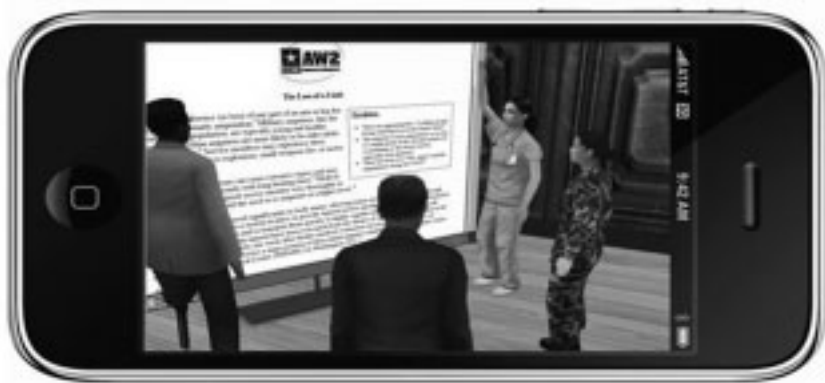
From Wired Broadband to Mobile Wireless Health Platforms

In the past, Veterans who opted to use the virtual world health coaching program required **wired broadband internet connectivity** for their desktop or laptop computers to access a 3D collaboration environment to work with their health coach as depicted below.



However, Veterans who reside in rural areas can face challenges acquiring such wired services. Recognizing this limitation, VetAdvisor worked with our technology partners to leverage the most ubiquitous of consumer electronic devices: **the mobile phone**. In the United States, there are over 285 million mobile phones in use, which equates to a 91 percent market penetration. The use of mobile devices to wirelessly provide highly mobile or rural populations direct access to a health care system is an important component in VA's transition to the Patient Centered Medical Home model. VetAdvisor will launch a virtual world smartphone capability (i.e., iPhone) in the fall of 2010. By extending the virtual world to smartphones, we can significantly increase the Veteran user base in rural areas where broadband service is not available but cellular service is. Additionally, please note that if Veterans opt to not to use the virtual world, they can simply use their cell phones to obtain health coaching services.

Today's Veterans are increasingly reliant on mobile devices for communication and entertainment. VetAdvisor allows Veterans to access their health coach/virtual room on their own terms at a time and place that is most advantageous to them. The image below is an example of the VetAdvisor Virtual Room (VVR) as hosted by an Apple iPhone. We envision Veterans using these mobile devices anywhere and anytime they desire to work with their health coach within the virtual world. The scene below depicts a Veteran working with his medical team in the VVR to discuss the loss of a limb.



Leveraging the latest wireless technology employing telephonic and virtual world platforms, this program provides a cost-effective, appropriate and popular expansion of VA's telehealth capability to allow for convenient follow-up with Veterans in urban and especially rural communities that VA identifies as at risk. Without this program, many of these Veterans might not return to VA to get the help they need or have as successful a return to their jobs, school and families.

The Evolution of VetAdvisor

VetAdvisor was initiated as a competitively awarded contract in 2007 by VISN 12, to Three Wire Systems, LLC (Three Wire), a Service Disabled Veteran Owned Small Business, and MHN, a Health Net behavioral health company.

Veterans who enroll in VA after returning home do not always seek clinical help until their mental health needs are critical. This may be due to a lack of understanding of symptoms, denial that a problem exists, lack of awareness of available mental health support, or stigma. VetAdvisor overcomes these barriers through its telephonic/virtual approach to identifying behavioral health care issues and virtual health coaching. VetAdvisor contacts those Veterans who may not take the initiative to get involved in mental health care before a tragedy or issues occur. VetAdvisor does this by using a proactive outreach approach:

- Using Computerized Patient Records provided by VA, VetAdvisor representatives call Veterans to thank them for their service
- During the phone call or at a scheduled date/time that is convenient to the Veteran, the health coach assesses the Veteran through a series of VA-approved screenings. The screenings cover both medical and behavioral health conditions associated with serving in combat to include: PTSD, Traumatic Brain Injury (TBI), suicide risk, substance abuse, depression and common medical disorders.
- If needed, a referral is made (and followed up on) to a VA mental health clinician.
- The VA medical facility is provided with the results of these screenings. The VA uses the results for follow-up and further evaluation. Once Veterans with behavioral issues are identified, they are encouraged to enroll in the VetAdvisor Health Coaching Program.
- The Health Coaching Program facilitates and supports Veteran involvement in existing VA services. A health coach is assigned to the Veteran for regular contact, advocacy, skill building, support and to provide motivation to seek treatment.
- Coordination continues with the Veteran, health coach, and primary care physician for as long as necessary.

Health coaching services are provided to Veterans through telephonic communication and/or virtual collaboration technology—the VetAdvisor Virtual Room (VVR). In the VVR, the Veteran and the coach interact as avatars. This highly immersive virtual environment provides strong feedback that enhances collaboration and communication. Virtual technology assists Veterans in their reintegration efforts in a number of ways. One of the major advantages is that it allows for the Veteran to discuss personal issues from the privacy of his or her own home or private setting of choice. Veterans may be more willing to acknowledge the magnitude of their issues in this private environment. Secondly, it saves the veteran time and travel costs associated

with office visits. For today's Internet savvy generation of Veterans and their families, this form of communication feels more natural than traditional communication methods.



VetAdvisor Coaching Groups

During the 18 month pilot period, VetAdvisor engaged over 10,000 Veterans from VISN 12. As a result of the program, over 1,100 Veterans were directed to VA medical facilities for follow up on positive screening results. The statistics support the program's success: when a Veteran was successfully contacted, there was a **95 percent** acceptance for health coach screening appointments. The types of issues discussed in health coaching sessions cover a wide range. The top issues are occupational, anxiety, health lifestyle management and depression.

The figure below illustrates the range of issues addressed in the sessions.



VetAdvisor's proactive outreach and screening for behavioral issues has proven to be an effective tool in assisting Veterans ability to access services to treat or prevent potential issues such as PTSD, depression, or substance abuse that can lead to a downward spiral in their life and even result in homelessness. It is designed to provide support when and where the veteran chooses, and to motivate those who realize they may benefit from assistance to access services. It augments existing VA services by being pro-active rather than just waiting for the Veteran to seek care. The VetAdvisor program is a successfully demonstrated approach to increase and improve the VA's involvement and assistance to OEF/OIF Veterans. The VetAdvisor program can be offered throughout VHA to ensure that Veterans do not fall through the cracks following their initial visit to and enrollment in VA. VetAdvisor provides the VA a mechanism to overcome access to care challenges for Veterans living in

rural areas by using technology, including wireless technology, and solutions to provide outreach and ongoing support to Veterans, regardless of where they live.

On behalf of Three Wire Systems and MHN/Health Net, we would like to thank you again for your interest in ways telehealth solutions like the VetAdvisor program can help our Veterans and their families in geographically remote areas receive the care and services they have earned through service to our country. We are grateful to the Subcommittee for its leadership and commitment to identifying innovative programs to improve access to and promote quality of care that can support the unique needs of enrolled Veterans residing in geographically remote areas.

Prepared Statement of John Mize, Director, LifeWatch Federal, LifeWatch Services, Inc., Rosemont, IL

Thank you for the opportunity to testify this morning. LifeWatch is a Health IT telemedicine service provider that represents the future of medicine in the United States. It is our privilege to serve The Department of Veterans Affairs in almost 40 facilities. Currently our services help diagnose patients suffering from arrhythmia and obstructive sleep apnea in an ambulatory and near real time environment. LifeWatch has built a virtual health care service solution that supports efficient data transfer of critical health data to providers for diagnosis and treatment. This virtual service environment is a launching pad for future disease specific management of health data supporting improved patient outcomes, continuity of care, reduction of Emergency Room visits and unnecessary hospital readmissions.

We are most certainly at a crossroads in health care. As the estimated 40 million Americans aged 65 and older enter the insurance pool in the coming years, our Nation's health care system will be faced with many challenges to effectively meet the needs of our Aging population. Older patients with chronic diseases will consume an ever increasing portion of total health care spending. Moreover, funding constraints coupled with an increasing shortage of health care providers and a deficient hospital capacity to meet this ever-growing demand will further challenge our present system.

The Department of Veterans Affairs in particular will be serving a significant percentage of our Aging population with one or more chronic health care diseases, and the increased demand for limited health care resources is an issue that has and will continue to be an issue for the VA. According to data from Department of Veterans Affairs the percentage of Veterans age 65 or greater is expected to increase roughly 7 percent in the next 20 years.¹

Given this environment it is critical that we continue to identify, research, and incentivize new delivery methods for health care in the United States. Telemedicine offers significant promise for reducing barriers regarding supply & demand, geography, a changing patient-provider relationship, and most importantly for reducing cost and improving outcomes for chronic diseases. The technology is here now. Whether it is provider-to-provider video consultations, remote telediagnosics, remote chronic disease management, or wireless monitoring, the technology is all readily available today and in many cases proven many times over.

Despite overwhelming evidence regarding the benefits of telemedicine, CMS has been slow to adopt reimbursement structures that incentivize providers to adopt the technology in addition to supporting innovation among device manufacturers, software providers, and medical services. CMS has been challenged with managing costs without abuse to the system because telemedicine is a new method of health care delivery with unique costs.

The Department of Veterans Affairs has been a bright spot in terms of the adoption of innovative wireless and land based telemedicine solutions which have been proven to reduce cost, improve outcomes, and support the large population of rural veterans in geographically challenging locations. According to the Office of Rural Health an estimated 38 percent of all veterans live in either rural or very rural geographies.²

The Office of Care Coordination under the leadership of Dr. Adam Darkins has proven that telemedicine overcomes challenges in managing chronic diseases even among the most difficult to treat and historically noncompliant patient population.

¹ Veteran Population Model; VetPop 2007. Office of the Assistant Secretary for Policy and Planning Office of Policy (008A2). <http://www1.va.gov/VETDATA/Demographics/Demographics.asp>

² The Office of Rural Health, Department of Veterans Affairs http://www.ruralhealth.va.gov/RURALHEALTH/About_Rural_Veterans.asp.

According to Dr. Darkin's research, the VA telemedicine program managed a 25 percent reduction in number of bed days of care as well as a 19 percent reduction in hospital admissions for patients using telemedicine to manage chronic diseases.³

While telediagnosics with the use of our services has not been as centrally driven as chronic disease telemonitoring, we have a number of shining examples of VA facilities utilizing our wireless service to overcome challenges in treating rural patients.

The LifeStar Ambulatory Cardiac Telemetry (ACT) service platform is based upon an algorithm that automatically and instantly detects and transmits clinically significant changes in heart rate and rhythm. For example, if you are complaining of feeling dizzy, lightheaded or a racing heart your cardiologist might prescribe our service for 30 days to help diagnose what is causing the changes in your heart rate or rhythm. The VA Medical Center completes the enrollment to LifeWatch and we in turn ship the device directly to the patient's house with all the necessary equipment and a prepaid envelope to mail it back following completion of the study. Following a successful implementation of the service the patient simply goes about their daily activity while the device and service continues to work.

The transmission is sent via a cellular network such as Verizon to one of our Joint Commission Accredited monitoring facilities in which certified cardiovascular technicians are staffed 24 hours a day, 7 days a week. The technicians view transmission, edit the ekg data, create a report, and provide it back to the clinician via a secure password enabled Web site or a direct EMR interface. The LifeStar ACT service increases the diagnostic yield compared to antiquated technology increasing the likelihood that a diagnosis will be made and a treatment plan incorporated which ultimately improves patient outcomes and reduces the cost of cardiovascular disease and stroke.

An improvement in the incidence of stroke increases quality of care and at the same time significantly reduces cost. Research from the Stroke Queri team based out of the Indianapolis VAMC indicates that stroke cost the Department \$315 million in FY 2005 with a cost per patient of over \$18,000. The importance of stroke within the VA is emphasized by the fact that stroke patients account for over 10 percent of the VA's complex caseload, with a cost per patient that is over 3.4 times the overall VA average.⁴

Additionally the service allows veterans to remain in their home, reduces travel reimbursement expenses, and allows VA medical centers to shift employee resources to other more important responsibilities. The impact for rural veterans is even more pronounced in regards to cost savings, access to care, and improved outcomes.

We have seen significant success stories of VA Medical Centers that have made the leap into utilizing advanced technology like the LifeStar ACT to the benefit of their patient population. For example prior to utilizing the LifeStar ACT service, the Las Vegas VA Medical Center was flying patients to San Diego to be hooked up on antiquated technology. The clinic made the decision to utilize our service which significantly reduced travel reimbursement expenses, allowed the VA to shift employee resources to other more important responsibilities, and allowed veterans to remain in their homes for extended diagnostic care.

LifeWatch has also recently introduced a home sleep testing service to the market for the diagnosis of Obstructive Sleep Apnea. The NiteWatch service has the potential of significantly reducing costs for severely overburdened sleep labs within the Department of Veterans Affairs, and at the same time stands to save the VA millions in lost revenue from fee service commercial sleep labs. Wait times for sleep labs within many VA facilities exceeds 6 months and as a partial solution many facilities utilize Fee Service to push patients to commercial sleep labs at Medicare rates. Our service is less than half the price of using a commercial sleep lab, stands to eliminate chronic patient waiting lists, and helps improve compliance as the testing is all completed in the home. According to a recent article published in the USA Today, "veterans are four times more likely than other Americans to suffer from Sleep apnea. About 5 percent of all Americans suffer from sleep apnea compared to 20 percent of veterans". The number of claims for the sleep apnea has gone from 39,145 in 2008 to 63,118 in 2010.

While there are many success stories we have also had our fair share of struggles within the VA. We are a GSA small business vendor and despite our status on the

³Darkins A, Ryan P, Kobb R, Foster L, Edmonson E, Wakefield B, Lancaster A. *Care Coordination/Home Telehealth: The Systematic Implementation of Health Informatics, Home Telehealth, and Disease Management to Support the Care of Veteran Patients with Chronic Conditions*. Telemedicine and E-Health December 2008;vol. 14 no 10 1119.

⁴Department of Veterans Affairs, *Stroke Queri Strategic Plan and Annual Report, 2007*; 8-9.

Schedule, procurement remains a struggle. It can take upwards of 2 years for some facilities to finalize the budgeting and contracting process despite the clinicians request to utilize the service. The disjointed nature of contracting and procurement necessitates that we work facility by facility on the contracting and procurement process. We have seen some success with Project Hero. As an in-network provider the program appears to expedite the process and simplify procurement for facilities in the four VISN's under the demonstration project.

Additionally we've struggled with a lack of a quality standard of care for remote cardiac monitoring. In 2004 CMS placed a requirement on remote cardiac monitoring which included the necessity of providing 24 hour live attended coverage for patients wearing ambulatory devices. The VA does not follow the same standard of care across the board. While there are many VA facilities that do utilize LifeWatch or a similar service, many VA Medical Centers own their own antiquated equipment and provide their patients with their own monitoring often without providing 24 hour live coverage. For example, if a patient were put on a VA owned monitor and had a serious cardiac event on Friday evening the clinic would not hear about it until the patient call to transmit the data on Monday.

Lastly we have struggled with a lack of clarity on how to interface our data with the Vista Imaging/CPRS electronic medical record system within the VA. Multiple cardiology clinics have requested that our data be interfaced and in fact many facilities will not use our service until we are interfaced. Despite the demand among cardiology clinics, we have hit multiple road blocks in terms of how to move forward. We are eager and ready to provide a secure interface with the Department of Veterans Affairs which will most certainly improve the standard and efficiency of care for our VA customers.

Mr. Chairman and Members of the Subcommittee, LifeWatch sincerely appreciates the opportunity to submit testimony and looks forward to working with you and your colleagues on improving the quality of care for our Nation's veterans with the use of advanced technology.

That concludes my written statement and I would welcome any questions you may have.

Prepared Statement of Kerry McDermott, MPH, Expert Advisor, Federal Communications Commission

Good afternoon Chairman Michaud, Ranking Member Brown, and distinguished Members of the Veterans Affairs Subcommittee on Health. My name is Kerry McDermott and I'm a member of the health care team for the National Broadband Plan at the Federal Communications Commission.

As you know, Congress mandated that the FCC prepare a "national broadband plan" that "shall seek to ensure that all people of the United States have access to broadband capability," and include a strategy for affordability and adoption of broadband. The FCC was also asked by Congress to address how broadband can be harnessed to tackle important "National Purposes," including health care.

Improving America's health and America's health care system is one of the most important tasks for the Nation. Health care already accounts for 17 percent of U.S. gross domestic product (GDP) and by 2020, it will top 20 percent.¹ This is due to many factors but one of the most important is that America is aging. There is a direct correlation between the elderly and chronic disease, which already accounts for 75 percent of the nations health care costs.² 5 percent of Medicare beneficiaries, who in most cases have one or more chronic conditions, constitute 43 percent of Medicare spending.³ By 2040, there will be twice as many Americans older than 65 as there are today.⁴ Exacerbating this situation is a health care supply problem. A shortage of tens of thousands of physicians is expected by 2020.⁵

¹ CTR FOR MEDICARE & MEDICAID SERV., NATIONAL HEALTH EXPENDITURE PROJECTIONS 2008-2018, <http://www.cms.hhs.gov/NationalHealthExpendData/downloads/proj2008.pdf> (last visited Jan. 21, 2010).

² Susan Dentzer, Reform Chronic Illness Care? Yes, We Can, 28 HEALTH AFF. 12, 12 (Jan./Feb. 2009), available at <http://content.healthaffairs.org/cgi/reprint/28/1/12>.

³ <http://www.cbo.gov/ftpdocs/63xx/doc6332/05-03-MediSpending.pdf>.

⁴ <http://www.census.gov/population/www/projections/summarytables.html>.

⁵ See *Health Res. & Serv. Admin., U.S. Dep't of Health & Human Serv., The Physician Workforce: Projections and Research into Current Issues Affecting Supply and Demand* (2008), <ftp://ftp.hrsa.gov/bhpr/workforce/physicianworkforce.pdf> (HRSA, *Physician Workforce*); Michael J. Dill & Edward S. Salsberg, *Ass'n of Am. Med. Coll., The Complexities of Physician Supply and De-*

But there's a set of broadband-enabled health information technologies (health IT), both now and emerging from development, that have the potential to improve clinical outcomes while reducing the cost of care and extending the reach of the limited pool of health care professionals. The New England Healthcare Institute found that remote patient monitoring for heart failure can save up to \$6.4 billion annually through reduced hospital readmissions.⁶ The Veterans Hospital System's Care Coordination/Home Telehealth Program (CCHT) for veterans with chronic conditions has resulted in a 19 percent reduction in hospital admissions and a 25 percent reduction in bed days for those who are admitted.⁷

Even though these technologies hold great promise, the U.S. lags behind other developed countries in health IT adoption, with one study ranking it in the bottom half (out of 11 developed countries) on every metric used to measure adoption.⁸

The Broadband Plan identifies some of the barriers that hinder the adoption of broadband-enabled, wireless health solutions and provides specific recommendations the government should undertake to remove these barriers, as well as foster innovation and investment in these new, life-saving devices.

With respect to e-care technologies, these barriers and subsequent proposed solutions fall into three main categories:

1. The connectivity gap. Broadband is either unavailable or too expensive.
2. Outdated regulations. Rules that were created when our only interactions with physicians were in their offices—not via remote monitoring and video consultations.
3. Misaligned economic incentives. The prevailing fee-for-service reimbursement system pays for volume rather than outcomes, and hence prevents reimbursement for many of these technologies.

Let me now discuss each in detail:

The first issue is connectivity, including both broadband at home as well as connectivity to health providers. With respect to the home, the plan estimates that 93 million Americans are not connected to broadband. We estimate that 14–24 million Americans do not have access to broadband where they live, even if they want it. It's hard to identify what proportion of the 14–24 million, who don't have the necessary infrastructure, is over the age of 65, let alone veterans. But what we do know is that individuals over the age of 65 are poor adopters of broadband, estimated to be 35 percent as compared to the national average of 65 percent.⁹ This is due to multiple reasons such as cost, digital literacy, and perceived lack of relevant digital content delivered over the Internet. In order to respond to these challenges, the plan recommends the launch of a National Digital Literacy Corps and that public and private partners prioritize efforts to increase the relevance of broadband for older Americans. The plan also sets the goal of providing access for every American to robust and affordable broadband service. This will be accelerated by a once-in-a-generation transformation of the Universal Service Fund, which includes the creation of a "Connect America Fund" as well as reforming the Lifeline and Link-Up programs. Mobile solutions are an important piece of the Broadband Plan's strategy for home broadband. Some States have materially lower 3G deployment than the national average and the proposed "Mobility Fund" would help bring all States to a minimum level of 3G or better wireless coverage.

mand: *Projections Through 2025*, at 6 (2008) (estimating a shortage of 124,000 physicians by 2025), https://services.aamc.org/publications/index.cfm?fuseaction=Product.displayForm&prd_id=244 (download report from this page).

⁶New England Healthcare Institute, Research Update: Remote Physiological Monitoring (Jan. 2009), available at [http://www.nehi.net/publications/36/remotephysiological_monitoring_research_update](http://www.nehi.net/publications/36/remotephysiologicalmonitoring_research_update).

⁷Adam Darkins et al., *Care Coordination/Home Telehealth: The Systematic Implementation of Health Informatics, Home Telehealth, and Disease Management to Support the Care of Veteran Patients with Chronic Conditions*, 10 *Telemed. & e-Health* 1118, 1118 (2008), available at <http://www.liebertonline.com/doi/pdf/10.1089/tmj.2008.0021?cookieSet=1>.

⁸CATHY SCHOEN & ROBIN OSBORN, THE COMMONWEALTH FUND, THE COMMONWEALTH FUND 2009 INTERNATIONAL HEALTH POLICY SURVEY OF PRIMARY CARE PHYSICIANS IN ELEVEN COUNTRIES 10 (2009), http://www.commonwealthfund.org/~media/Files/Publications/In%20the%20Literature/2009/Nov/PDF_Schoen_2009_Commonwealth_Fund_11country_intl_survey_chartpack_white_bkgd_PF.pdf. Count of 14 functions includes: (1) electronic medical record; (2, 3) electronic prescribing and ordering of tests; (4–6) electronic access to test results, Rx alerts, and clinical notes; (7–10) computerized system for tracking lab tests, guidelines, alerts to provide patients with test results, and preventive/follow-up care reminders; and (11–14) computerized list of patients by diagnosis, by medications, and due for tests or preventive care.

⁹Chapter 9, "Adoption and Utilization", National Broadband Plan.

A focus of mine has been the connectivity issues for health care providers. It is imperative that hospitals and physician offices have adequate connectivity as any care that will be delivered to an individual's home will originate in a health care facility of some description. Our analysis highlighted that some providers are not served by existing "mass-market" broadband infrastructure. Approximately 3,600 small physicians' offices fall into this gap. Of these, 70 percent are in rural locations. Furthermore, 29 percent of rural health clinics do not have access to adequate mass-market broadband. Larger providers must purchase "Dedicated Internet Access" (DIA) to meet their quality-of-service requirements, but DIA solutions are often at least 4X more expensive than mass-market solutions. This cost issue is further exacerbated by the fact that DIA solutions differ greatly in price, thus preventing all providers from having affordable broadband available to them.

The National Broadband Plan addresses the health care provider connectivity issues by proposing to revamp the FCC's Rural Health Care Program. The program provides three types of subsidies to public and nonprofit health care providers. It is the largest sustainable fund for health care connectivity within the government. The Commission will be considering ways to make the program more effective without changing the program's funding cap by creating a permanent infrastructure fund, broadening coverage for monthly recurring costs to all types of broadband services, and expanding eligibility for the program. Importantly, any FCC funding must ensure that broadband for health care providers is resulting in improved health outcomes, and we are working closely with the Office of the National Coordinator to understand the evolving "Meaningful Use" criteria as we consider how such criteria could be incorporated into FCC programs. These proposed changes will enable more institutions to acquire the infrastructure needed to support a realm of health IT solutions, opening the possibility for greater investment and innovation. A Notice of Proposed Rulemaking is expected to be released shortly, opening the formal comment cycle on this proposal to revamp the FCC's Rural Health Care Program.

The second set of barriers pertains to a range of regulations that prevent e-care solutions from being adopted. State licensing, credentialing, and privileging rules may prevent physicians from providing remote broadband-enabled care across State lines and even at in-state hospitals other than their usual place of work. Patient safety must be addressed by ensuring that physicians are suitably skilled—but regulations must not stifle the innovation and gains promised by health IT. To this end, the Broadband Plan recommends that credentialing, privileging, and licensing rules be re-evaluated. We are pleased that CMS is seeking comments on a proposed rule to revise privileging requirements to allow for the advancement of telemedicine nationwide while protecting the health and safety of patients.

There is regulatory uncertainty regarding the convergence of communications and medical devices. The combination of devices, applications, and communications networks is enabling clinicians and patients to give and receive care anywhere at any time. For example, mobile sensors in the form of disposable bandages and ingestible pills relay real-time health data over wireless connections. Diabetics can receive continuous, flexible insulin delivery through real-time glucose monitoring sensors that transmit data to wearable insulin pumps. Medical body area networks monitor various vital signs and detect the onset of a patient "crash" while in a hospital in time for treatment.

With these new solutions come new challenges. When medical and wireless devices and applications converge, the regulatory lines become blurred. At one end, general-purpose communications devices such as smartphones, wireless routers, and certain videoconferencing equipment are regulated by the FCC. At the other end, medical devices that critically monitor patient health or provide treatment or therapy are regulated by the FDA. Devices that do provide critical care and also use communications, such as life-critical wireless devices like remotely controlled drug-release mechanisms, are regulated by both agencies. In addition, device applications that would not be governed by the FCC but transmit over wireless networks might warrant FDA oversight, while the FCC might have better capability to assess the reliability of their communications capability.

Uncertainty regarding regulatory frameworks and approval processes can discourage private sector innovation and investment, and ultimately delay or prevent the availability of such solutions. The Plan calls for the FCC and the FDA to build on their long history of collaboration to resolve these issues. The agencies are holding a joint public meeting on July 26 and 27, 2010, to address these challenges. We propose to bring together various stakeholders from manufacturers to practitioners to patients to better understand the types of devices and applications that are being introduced, clarify the requirements that apply, and improve the regulatory and ap-

proval processes to the extent possible. Our aim at the FCC is to protect patient safety while promoting innovation and investment.

Lastly, although broadband connectivity and regulatory uncertainties are issues, the greater barrier is on the demand side of the equation. Within a fee-for-service reimbursement system, providers bear the costs of health IT implementation and changes to workflow, but don't fully capture the economic gains created through improved clinical outcomes. The plan recommends that well-understood use cases of e-care technologies should be incented with outcomes-based reimbursement, similar to the Meaningful Use program for Electronic Health Records. In addition, novel technologies should be tested for their clinical efficacy, as well as within payment model pilots, in order to ascertain their economic value. Given that it will take many years to implement an outcomes-based payment model, reimbursement should be expanded for e-care technologies that will prove system-wide expenditure reductions under CMS's fee-for-service model. It is imperative that there be economic incentives for physicians of various specialties to collaborate and better manage elderly patients with chronic conditions that often require multiple specialty inputs. In addition, incentives must be aligned to promote the prevention and better management of disease within the community rather than reactively and at greater expense within hospitals. The Plan recommends a dedicated effort by HHS to propose specific programs and reimbursement changes that will help realize the value of e-care technologies. Without reimbursement reform, the market for health IT solutions is limited. This, in turn, inhibits investment and innovation; the FCC believes this trend must be reversed.

There are multiple barriers that must be resolved in order to fully develop the ecosystem of broadband-enabled health IT. The underlying infrastructure must provide a solid foundation to build upon. Yet, technology alone will not solve our health care challenges; it must be coupled with payment reform, innovation in service delivery, and improved regulatory transparency. It is imperative that government action—and inaction—do not hinder investment and innovation. The recommendations of the National Broadband Plan seek to unlock the value of health IT so all citizens may realize its benefits and cost savings. Any government approach to solve these issues must be coordinated—not only across the government, but with the private sector and the entire health care community.

I thank you all for giving me the opportunity to speak today.

**Prepared Statement of Colonel Ronald Poropatich, M.D., USA,
Deputy Director, Telemedicine and Advanced Technology Research Center,
U.S. Army Medical Research and Materiel Command, Department of the
Army, U.S. Department of Defense**

Chairman Michaud, Representative Brown, Members of the Committee thank you for this opportunity to discuss the U.S. Army Medical Department current mobile health projects, future initiatives and challenges in implementing wireless technology across health care organizations.

The U.S. Army recognizes that mobile devices represent an enormous opportunity for health care outreach, not only within the active duty and dependent population, but also within the global community. Globally, there are currently over 4.6 billion cell phones and approximately sixty percent of the world's population owns cell phones. Social networks, too, have come to go hand in hand with mobile devices. Facebook has surged past Yahoo! as the second most popular site in the U.S., drawing nearly 400 million visitors. Statistics also show that more people access social networks using the mobile web than they do using desktop computers. Mobile devices are superseding desktop and even laptop computers as the tool of choice for communication in the virtual sphere.

Mobile health or "mHealth"—defined broadly as emerging mobile communications and network technologies for health care systems—can be an agent for behavior change, impacting health care challenges such as smoking cessation, diabetes, and appointment attendance. Applications for cell phone and smart phone platforms are emerging that enable clinical consultation, patient and provider education, research, biosurveillance, and disease management.

The development, implementation and maintenance of any mobile cell phone solution presents a number of innovations, challenges and solutions not widely seen in other aspects of telemedicine. Wireless device and carrier credentialing and certification, lack of interoperability, Health Insurance Portability and Accountability Act (HIPAA) considerations, and maintaining currency in an ever-changing landscape of devices and operating systems requires strategic planning and long range focus.

There are numerous current obstacles and challenges to launching a comprehensive mobile solution, yet many successes are evident. Today I would like to discuss three initiatives the U.S. Army's Telemedicine and Advanced Technology Research Center is currently investigating to improve patient outreach and health outcomes using wireless technology.

The U.S. Army has developed, deployed, and is currently evaluating a mobile telephone-based secure messaging system called "mCare". The "m" in mCare stands for mobile. The project explores the potential of mobile devices, specifically personal cell phones, for use in the Military Healthcare System. The mCare system is a secure, HIPAA compliant, bi-directional messaging system that allows information to be sent to the servicemember's personal cell phone. The Soldiers' responses are returned securely to the mCare web portal. Presently, mCare provides daily messages via cell phone to wounded Warriors in the outpatient phase of their recovery, while they are recuperating in their homes. The servicemembers' own personal cell phones are utilized.

Patients with mild traumatic brain injury are a target population for mCare. Health tips, appointment reminders and general announcements are distributed from a secure central Web site where health care providers can enter and control message content, as well as review acknowledgements and delivery confirmations. Each mCare patient receives a minimum of 6 messages per week, meeting or exceeding the U.S. Army's required contact rates for wounded Warriors receiving outpatient care in their home communities.

The initial group of mCare's targeted participants are Warriors in Transition (WTs) assigned to Community Based Warrior in Transition Units (CBWTUs). Soldiers assigned to a CBWTU are typically National Guard or Army Reservists who receive outpatient care in their home community and are monitored remotely by a case manager/care team from a regional case management center. mCare is not intended to replace all face-to-face or telephone based encounters from the CBWTU team, rather it is designed to complement these efforts with additional means of communication. Initially mCare has been offered to patients assigned to 5 selected CBWTU sites in Alabama; Florida; Illinois; Massachusetts; and Virginia that cover 26 States. Future locations for mCare are being explored at this time at 4 additional sites.

The mCare system incorporates modified commercial off the shelf technologies under the oversight of the U.S. Army Medical Research and Materiel Command's Telemedicine and Advanced Technology Research Center. During the development of mCare particular attention was paid to network security and privacy considerations. Information that is sent to the Soldier's mobile phone is transmitted through a secure Virtual Private Net (VPN) tunnel, and is only accessible with a six-digit personal identification number (PIN) code. Cell phone users are prompted to open this application through a standard text message whenever critical new information has been sent to the mCare application.

As of 1 June 2010, mCare has delivered over 18,500 messages to over 300 WTs. Sixty-three percent of this message activity is related to appointment reminders, which are sent to the patient 24 hours and 90 minutes prior to each scheduled clinical encounter. The system has demonstrated improvement in appointment attendance rates. Seventeen percent of the message activity is attributed to health and wellness tips, which are customized to the needs of each patient from a library of validated resources within the mCare application. Twelve percent of the message traffic is related to unit specific announcements.

There has been no appreciable age bias to the acceptance of mCare by patients; there are as many users over the age of 30 participating in the project as are within the 18-30 age groups. Additionally, 84 percent of the mCare patient participants are enlisted servicemembers; 16 percent are officers. More than 90 percent of the volunteer users surveyed found the mCare application on their phone easy to use or somewhat easy to use. Nearly 75 percent of the users surveyed preferred to receive contact through mCare more than once a week, and 65 percent reported that mCare improved their communications with their unit.

There have been a number of challenges to overcome to achieve success with the mCare project to date. Because the goal was to leverage the patient's personal cell phone, and not introduce a new technology to the Soldier, a wide variety of phone models and wireless carriers needed to be accommodated. Each wireless carrier has separate testing and certification processes, and specific devices have different installation processes, which all result in a complex technological process to navigate for the clinical teams. Developing a streamlined process that was as simple as possible for the care team, while negotiating with each wireless carrier to allow the application to be accessible to patients at no cost has been a time consuming process that is still ongoing. Full integration with the patient health record (PHR) is not

currently part of mCare's model but the feasibility and cost to incorporate PHR is being explored.

There is increasing interest in expanding the mCare to incorporate additional use cases and support other services outside the Army. The Veterans Health Administration and the medical departments of the U.S. Navy and Air Force have shown interest in utilizing mCare to support their case management activities. The Defense Veterans Brain Injury Center would like to utilize mCare for patient follow up. Additionally, other use cases such as medication monitoring, polypharmacy assessment, *continuous positive airway pressure* monitoring at home for sleep disorders, pain management and medical student well being evaluation have been proposed as additional use cases for mCare, with funding identified to enable this expansion.

The second initiative I would like to highlight is Text4Baby. Text4Baby (T4B) is a free mobile health information service that provides timely health information to women from early pregnancy through their babies' first year. Led by the National Healthy Mothers Healthy Babies Coalition, the T4B campaign has forged a new public-private partnership between government, private sector businesses, non-profits and academic institutions to develop innovative new models for leveraging mobile phones and the extensive cellular infrastructure to address critical health care challenges in the U.S.

The T4B service aims to use one of the most widely used technologies in America—the mobile phone—to promote maternal and child health. Women who sign up for the service receive three free text messages each week timed to their due date or baby's date of birth. The messages focus on topics critical to the health of mothers and babies, including nutrition, seasonal flu prevention and treatment, mental health issues, risks of tobacco use, oral health, immunization schedules, and safe sleep.

The Army Medical Department plans to introduce T4B to military mothers at Madigan Army Medical Center at Joint Base Lewis McChord in Washington as part of a demonstration to formally evaluate the acceptability and utility of using text messaging to deliver information and encourage healthy behaviors as part of its overall maternal health outreach initiatives.

The third wireless application that the U.S. Army is investigating is the impact of a video cell phone reminder system on glycemic control in patients with diabetes mellitus (diabetes). Diabetes affects approximately 24 million people in the U.S. and is associated with devastating complications in both personal and financial terms. Diabetes is the leading cause of blindness, non-traumatic amputations, and renal failure in adults and reduces life expectancy by 5–10 years. Maintaining glycemic control is critical for the health of diabetes patients. The reasons why more patients do not reach appropriate goals for glycemic control are multiple and complex, among them poor compliance with self monitoring of blood glucose (SMBG) and medication non-adherence. Despite the evidence showing the positive impact of SMBG, compliance with SMBG remains suboptimal. Approximately one-third of patients with diabetes are non-adherent to their medications—a compliance rate which is lower than many other medical conditions.

The hypothesis of this study being conducted at the Walter Reed Army Medical Center is that a cell phone video reminder system will improve self-care and glycemic control in patients with diabetes when compared with standard of care. The primary endpoint is improvement of glycemic control as measured by A1C and the secondary endpoints are mean daily glucose levels, the number of both hypoglycemic and hyperglycemic events, the amount of time spent in target blood glucose, and the perceived level of diabetes-related stress between the two groups.

Preliminary results show that A1C improves more in those patients who are provided with video reminders compared with those who did not receive them. Overall, the viewership was about 50 percent which exceeds that of most other e-Health studies. Among subjects who watched at least two-thirds of the daily, cell phone-based video tips/reminders the decline in A1C was greater than it was for subjects who used the technology less. Using reminders delivered via the ubiquitous technology of cell phones appears to be an effective way to improve glycemic control and thereby long-term outcomes. This approach could be modified for use in other chronic illnesses and in other unique populations such as the elderly and disabled.

Currently, the U.S. Army Research and Development Command (RDECOM) is evaluating commercial handheld solutions such as iPad, iPhone, iPod, and other platforms and their applicability in a tactical setting. RDECOM has developed numerous handheld command and control solutions and is supporting the development and transition of MilSpace, a combined planning and social networking environment. The Telemedicine and Advanced Technology Research Center is working with

the RDECOM to leverage U.S. Army investments in mobile technology and apply it to health care both here in the U.S. as well as in deployed settings overseas.

The U.S. Army's evolving role in humanitarian operations represents another opportunity to utilize mobile technology as it pertains to recently approved DoD policy on Medical Stability Operations. The relative ubiquity of cell phones throughout the world makes them, potentially, a vital tool in creating medical infrastructure and sharing medical knowledge where they are most needed.

The opportunities presented by mHealth are considerable, yet there are several challenges to overcome. It will be necessary to ensure that mobile applications are integrated with legacy information systems. A wide variety of mobile devices will have to be supported, as well network connections of many types. The security, privacy, and confidentiality of patient data both on the device and during its transmission remain important considerations. Furthermore, regulatory issues may, ultimately, enter the picture. As mobile phones evolve from simple communication tools into complex physiological data-gathering devices, the line between cell phone and medical device is blurring. Finally, from a practical perspective, it is important to avoid overloading already-busy clinicians with more information than they are able to use.

The U.S. Army Medical Department is committed to developing a strong research portfolio in mHealth. The convergence of health care and mobile technologies has the potential to change the lives of individuals in rural and austere settings and contribute to improved care, healthier lifestyle choices, and ultimately, increased quality of life for servicemembers as well as those in need throughout the world. Thank you again for allowing me to highlight the Army Medical Department's accomplishments and thank you for your continued support to those who serve our Nation.

**Prepared Statement of Gail Graham, Deputy Chief Officer, Health
Information Management, Office of Health Information, Veterans Health
Administration, U.S. Department of Veterans Affairs**

Good morning, Mr. Chairman. Thank you for the opportunity to testify about the Department of Veterans Affairs' (VA) efforts to deliver optimal health care to Veterans in rural areas and our use of innovative wireless health technology solutions to better serve our Veterans. I am accompanied today by Dr. Adam Darkins, Chief Consultant for Care Coordination in the Office of Patient Care Services, and Dr. James Breeling, Deputy Executive Director, Office of Information and Technology, Department of Veterans Affairs.

As the Committee well knows, all health care providers, including VA, face significant challenges in providing optimal treatment to patients in rural and highly rural areas. Emerging technologies and new models of care promise to improve clinical quality and reduce costs while at the same time, expand our options for delivering health care to all patients. VA is committed to pursuing strategies that harness such technologies and models of care to enhance health care delivery. Our aim is to ensure our rural Veterans receive the quality health care they earned through service to this country.

My testimony today will describe the latest wireless technologies VA is using, detail our plans for further expansion, and conclude by discussing a new model of care that is more Veteran-centered, results-driven, and forward-looking.

Current Use of Wireless Technologies

VA is exploring many potential applications of wireless technologies. For example, VA has installed Very Small Aperture Terminal (VSAT) Satellites on its 50 Mobile Vet Centers, which are used primarily in rural areas by the Readjustment Counseling Service (Vet Centers) to provide outreach and readjustment counseling service to Veterans wherever it is needed. While not located in a rural area, the Washington D.C. VA medical center is undertaking a pilot program through which physicians can access electrocardiogram (EKG) data on their BlackBerry handheld devices.

VA uses wireless technology and services to assist our Veterans with disabilities with quick access to information and to foster opportunities to live at the highest level of functionality possible. VA provides various critical cueing aids for our Veterans who struggle with memory loss, spatial disorientation, sensory loss and other cognitive difficulties. Cueing aids can assist a Veteran in remembering appointments, medication schedules, and work or academic appointments—essentially helping create a better quality of life for the Veteran. These devices include personal

digital assistants (PDA), smartphones, personal pocket computers, global positioning system (GPS) devices, and the Livescribe Pulse Smart Pen. VA's Blind Rehabilitation Service partners with VA's prosthetics programs on Veterans training and support through assistive devices and technologies with embedded wireless functionality, such as GPS tools or PDAs; wireless computer towers, laptops and notebooks that provide our Veterans the ability to read screen print through speech output and Braille; audible prescription reading devices; and other items, such as the K-NFB Reader, that can scan and read print aloud, function as a GPS, PDA and mobile telephone with email and internet capabilities. These technological avenues are just part of the important work we are doing for our Veterans and their families.

In our medical facilities, we are completing Wireless Local Area Network (LAN) projects to improve the coverage and reliability of mobile devices such as Bar Code Medication Administration (BCMA) carts and laptop computers so that our clinical staff can access a Veteran's electronic health records. VA's BCMA application is used to quickly document and thoroughly validate administration of medication at VA facilities through barcode applications and handheld devices. Well ahead of many of VA's medical counterparts in the private sector, a wireless infrastructure has been in place within each VA facility since 1999. This wireless network has vastly improved access to critical patient information used for clinical decision-making at the very point where treatment is provided. VA uses this access and mobility of information, provided by wireless connectivity, for positive patient identification and to accurately administer the proper medications at the Veteran's bedside using barcode scanning technology. To date, VA has administered over 1 billion medications using this technology to ensure our Nation's Veterans receive the correct medication, in the correct dose, at the correct time. We are developing new projects within VA that will expand the use of wireless connectivity and barcode technology to accurately administer blood products and collect laboratory specimens for both clinical laboratory and anatomic pathology.

VA dental providers are using wireless technology to access software designed to improve point of care decisions. This platform is available to all VA dental providers for download onto wireless devices, and many of our providers have taken advantage of this unique opportunity. For example, Lexi-Comp provides convenient, immediate access to time-sensitive, dentistry-specific pharmacology and clinical reference information via wireless devices. Providers can quickly access important information about drugs and natural therapeutics, oral diseases, implants, endodontics, clinical periodontics, oral surgery, treatment of medically compromised patients and medical emergencies, to name a few examples. This technology significantly improves medication safety by providing important drug interaction analysis and side effect profiles while increasing positive treatment outcomes through a vast knowledge base available at the provider's fingertips. To keep up with today's demands, many of our providers report using this technology repeatedly throughout the day and even after hours when making determinations about patient care.

My HealtheVet, VA's online personal health record (PHR), is yet another area of significant progress in wireless technology for VA. As a complement to traditional health care services, the My HealtheVet PHR provides Veterans with personal online access to VA health care, featuring patient-friendly health education information and wellness reminders for preventive care, to enhance patient engagement and informed decision-making. My HealtheVet provides our Veterans with new and innovative options to connect with our team at VA. A Veteran who was an early adopter in the pilot program and now uses the national system has described this application's impact by stating, "I feel more in control and aware of my choices." Having our Veterans as partners in their health care is essential to our success at VA.

VA has seen the use of My HealtheVet grow significantly. To date, it serves over one million registered users, which represents 14.5 percent of VA patients receiving health care services. The total number of visits to My HealtheVet since it was launched in November 2003 now exceeds 40 million. Veterans have refilled more than 15 million prescriptions, at a rate of approximately 600 per hour, through My HealtheVet since VA made available online interactive ordering of prescription refills in August 2005—all from the comfort of the Veteran's own home.

For fiscal years (FY) 2009 and 2010, VA's Office of Rural Health awarded a grant for \$981,852 to improve access to care by engaging our Veterans in co-designing improvements to My HealtheVet. VA conducted working sessions with Veterans in five rural communities, where Veterans suggested specific changes to My HealtheVet including the addition of features they desired in a mobile version of the application. In the first phase, our Veterans defined core functionality for a mobile version of My HealtheVet, and VA is now extending this work by using the models generated

in the initial phase to build a working prototype that will be implemented on a generic internet-enabled mobile phone as well as brand-specific versions. The mobile prototype will be evaluated by our Veterans in a proof-of-concept environment. This testing will focus on the user's experience in important areas such as functionality, usability and appeal. Phase II will also support further meetings with our Veterans for feedback on how to visually model the complete set of functions they desire in a mobile version of My HealtheVet.

Around the world, mobile and wireless devices are increasingly a primary tool for connecting people to the internet. In early 2009, VA launched a mobile-friendly version of its internet Web site at <http://m.va.gov>. VA's mobile site tailors key VA content for mobile devices and is designed to be compatible with multiple brands of cell-based internet browsers. This site provides access for our Veterans to benefits information, facility locations, eligibility details for returning Operation Enduring Freedom/Operation Iraqi Freedom (OEF/OIF) Servicemembers, VA news, and multimedia content. On smartphones (such as the iPhone), users can plot VA facilities on a satellite map, perform integrated phone dialing via VA's Facility Locator, watch VA videos on YouTube, use the mobile VA Gravesite Locator, and share articles of interest via social networking Web sites. We want to be accessible and transparent to our Veterans and their families wherever they may be.

Future Expansions of Wireless Technologies

Looking ahead, VA's Veterans Health Administration (VHA) has examined potential for additional innovative applications targeting specific populations of Veterans, such as those with TBI, post-traumatic stress disorder (PTSD) or visual impairments. We further anticipate development of more resources for our clinicians. VA has initiated plans to develop and deploy a nationwide program to use wireless networking (separate from the VA wireless LANs) for internet use at VA health care facilities. Veterans and their families will be able to use this technology for communications, email, and otherwise therapeutic activity during patient stays at VA facilities. VHA has recently established a Program Office dedicated to using Real Time Location Systems (RTLS) to support locating and tracking equipment, clinical staff, patients, and patient or staff movement. This type of information will help improve the quality and efficiency of health care delivery to our Veterans by improving workflow, to cite one example. RTSL uses wireless LAN, Radio Frequency Identification (RFID), Infrared and other technologies. Future plans for expansion include developing requirements, standards and overseeing broader RTLS deployment.

New Model of Care

Wireless technologies are part of an overall continuum of care at VA and not a "stand alone" entity. We are undertaking the most significant change in our model of care delivery since the rapid expansion of community-based outpatient clinics began in the 1990s. But in many ways, this new and innovative approach is actually a continuation of the same strategy VA has always pursued: bringing care closer to our Veterans and making it as accessible as possible. Our mission of Veteran-Centered care engages the Veteran, family and health care team in a partnership to improve communication and assure that the needs and preferences of the patient are considered.

To support this significant effort, VA has joined the Patient-Centered Primary Care Collaborative, a national coalition of other public and private sector members dedicated to improving primary care. We are re-designing our systems around the needs of our patients and improving care coordination and virtual access through enhanced secure messaging, social networking, telehealth, and telephone access. An essential component of this approach is transforming our primary care programs to increase our focus on health promotion, disease prevention, and chronic disease management through multidisciplinary teams. These changes will focus on improving the experience patients and their families have when seeking care from VA. We will benchmark with private sector organizations such as Kaiser-Permanente and Geisinger Health System. As always, we will seek patient input to help guide this important transformation.

The President's FY 2011 budget submission describes this new model of care in greater detail. VA will use the latest technology to remove barriers to our Veterans and increase access to VA services. This important initiative will enable VA to become a national leader in transforming primary care services to a medical home model of health care delivery that improves patient satisfaction, clinical quality, safety and efficiencies. VA Tele-Health and Home Care Model will develop a new generation of communication tools (i.e. social networking, micro-blogging, text messaging, and self management groups) that can be used to disseminate and collect critical information related to health, benefits and other VA services.

VHA's Preventive Care Program, a component of the new model of care, will develop and implement a program to provide telephone-based health behavior counseling for Veterans with risky health behaviors, including physical inactivity, unhealthy eating, smoking, and problem alcohol use, and health behavior-related conditions such as obesity. Using a health coaching model to assist our Veterans in making behavior changes by setting goals, developing action plans, using self-monitoring, and applying other self-management techniques, the Telephone Lifestyle Coaching (TLC) Center will increase Veterans' access to care to keep them as healthy as we can. We used this approach in a smaller pilot project for weight management among Veterans and found a significantly high level of patient satisfaction.

The new model of care will improve health outcomes and the care experience for our Veterans and their families. The model will standardize health care policies, practices and infrastructure to consistently prioritize Veterans' health care over any other factor without increasing cost or adversely affecting the quality of care. VA looks forward to working with our critical partners in Congress to ensure these important plans become a reality for our Veterans and their families of all eras across the country.

Conclusion

VA sincerely appreciates the continued support of Congress in supporting rural health initiatives that enable us to focus on extending current enterprise telehealth solutions as well as developing new telehealth solutions to serve our Veterans throughout the Nation for whom geographical distance from VA's physical health care assets often presents a challenge to receiving care. Like you, VA strives to ensure that every Veteran who qualifies has access to VA's world class health care.

Mr. Chairman, this concludes my prepared statement. I am pleased to address any questions the Committee may have.

Statement of Lincoln T. Smith, President and Chief Executive Officer, Altarum Institute, Ann Arbor, MI

Good morning, Chairman Michaud, Ranking Member Brown, and Members of the Subcommittee.

Thank you for inviting Altarum Institute to testify on how the Department of Veterans Affairs can utilize new and innovative wireless technologies to expand access to care for veterans. In our testimony, we will address a unique research study that we have successfully implemented at the Pathway Home, a residential veterans treatment center for returning warriors afflicted with mild traumatic brain injury and post-traumatic stress disorder. We will also share how we have been able to integrate clinical treatment, technology, and research to enhance the recovery of servicemembers who have served this country so valiantly.

Altarum Institute is a nonprofit health systems research and consulting organization serving government and private-sector clients. We provide objective research and tailored consulting services that assist our clients in understanding and solving the complex systems problems that impact health and health care. Our unique model combines the analytical rigor of a research institution with the business acumen of a traditional consultancy to deliver comprehensive, systems-based solutions that meet unique needs.

Altarum has a very strong commitment to serving the needs of our Nation's servicemembers and veterans. For over 30 years, Altarum and our predecessor organizations have worked to improve military and veterans health care serving such diverse clients as the TRICARE Management Activity, the Army, Navy, and Air Force medical services, and the Department of Veterans Affairs. Our commitment to our Nation's current and former servicemembers does not stop with our client-based work. Starting in 2008, we launched our \$7 million Mission Projects Initiative, which includes the multiyear Veterans Community Action Teams project which we have discussed with this Subcommittee in the past. Recently, we committed to continuing the use of our own funds to benefit servicemembers when we initiated our Veterans Transition to Community Project, which my testimony today will focus on.

Altarum's Veterans Transition to Community Project was initiated to address one of the most critical issues affecting the almost two million Americans who have directly served or supported Operation Enduring Freedom and Operation Iraqi Freedom. As in previous conflicts, many servicemembers were subjected to blast-related

injuries. Estimates of 12–20 percent¹ of them were close enough in proximity to a concussive event while deployed to screen positive for mild traumatic brain injury (mTBI). Many recover fully; however, others recover only partially and have their injuries revisit, and sometimes debilitate, them without warning.

Treatment teams have always struggled to develop comprehensive treatment plans from bits and pieces of information. Problems such as post-traumatic stress disorder (PTSD), substance use disorders (SUD), major depressive disorders (MDD) and/or mild traumatic brain injury all result in some level of short-term memory loss. The science of treatment is too often limited because of an incomplete picture of what is going on in the servicemembers' lives. To complicate things further, a large number of our warriors are Reserve or National Guard members who, because of the nature of their service obligations, did not stay on a post following mobilization, but instead dispersed after their release from duty to every corner of the Nation, making follow-up treatment and observation much harder.

An unfortunate reality is that many of our returning servicemembers simply do not receive treatment to address these serious health issues. TBI is estimated to have occurred in 12–20 percent of Iraq and Afghanistan veterans. Only 7 percent of veterans presenting for treatment through the VA have received treatment for their brain injury. The remaining 3–13 percent of the almost 2 million veterans have not received treatment at this time.² It has been projected these numbers could be as high as 300,000 troops.³ The number of military treatment facilities, VA facilities, and contracted facilities that have the requisite skills, knowledge, and training to address these psychological health needs is simply insufficient to meet this demand. New techniques are required.

Through our Veterans Transition to Community Project, Altarum has implemented a novel but elegant solution that has significant potential to dramatically impact the lives of servicemembers and ease the burden on providers. Our solution not only facilitates health and wellness for returning servicemembers and their families, but it also leverages the time and resources of existing clinical and treatment staff. The Veterans Transition to Community Project is exploring methods and technologies to connect servicemembers to the care they need using technology that is already owned by virtually all returning servicemembers—a cell phone. This technology builds on skills and knowledge that warriors already possess. The criteria are simple. Can you e-mail? Can you text? Do you like pictures? How about music? Can you answer questions with a scale of 1–9? This reduces training and implementation time to almost zero and also reduces participation resistance.

Our project addresses treatment in all phases of care. During the initial treatment phase, we make use of a simple Palm PDA to begin collecting information on mental well-being. We use the PDA to collect multiple ecological momentary assessments (EMA) from servicemembers diagnosed with PTSD, SUD, MDD, and/or mTBI. EMAs are short multiple choice questions that document items such as stress, rejection, fear, craving, pain, and coping several times daily over a period of months. Data are collected and analyzed to create a composite picture of the servicemember or veteran—not at the single instance of treatment, but across time and daily activity. These data improve the accuracy and applicability of treatment.

Once the servicemember or veteran begins the transition to home, we implement an innovative application of mobile phone technology to extend treatment and maintain contact with the patient. EMA data collected from the individual are compared with information gathered during the clinical treatment phases. Data are then used to tailor individualized two-way interactions with the servicemember or veteran customized to their strengths, needs, and recovery resources. Altarum uses EMA data, clinical observations, and patient input to offset patient-specific triggers while augmenting motivators and support system contacts. Reminders, supportive messages, pictures of pleasurable memories, inspirational music, and an interactive pain-scale support the servicemembers and veterans to avert crises that may affect them in their transition from the therapeutic environment to work and community life.

Altarum's Veterans Transition to Community Project extends treatment beyond the walls of any facility. All that is necessary is a cell phone connection. Our original test cohort continues to receive support and, when necessary, treatment as they

¹ Ramchand et al. (2010, February). Disparate prevalence estimates of PTSD among servicemembers who served in Iraq and Afghanistan: Possible explanations. *Journal of Traumatic Stress*, 23, 59–68.

² Carlson et al. (2010, February). Psychiatric diagnoses among Iraq and Afghanistan war veterans screened for deployment-related traumatic brain injury. *Journal of Traumatic Stress*, 23, 117–24.

³ Kehle et al. (2010, February). Early mental health treatment-seeking among U.W. national guard soldiers deployed to Iraq. *Journal of Traumatic Stress*, 23, 33–40.

disperse across the country. Because the core of the system depends on automation, time zones and work schedules do not affect service delivery. This intervention is driven by the demands of the servicemember, not the availability of clinical treatment staffs.

The advantages of our method of supporting treatment through this flexible yet common technology are manifold.

First, in a time of increasingly tight budgets, the incremental cost of maintaining a servicemember in this program is negligible. A month of effective contact can be maintained with servicemembers for far less than the cost of a single office visit. Altarum's project uses the veteran's existing cell phone. Once implemented, the secure Web-based treatment interface can be accessed from anywhere and updated in real-time by existing clinical or support staffs. No servers, computers, hardware, software, or expensive equipment are required.

Second, our technique is flexible and adaptable to the individual needs of each servicemember. Our armed forces are a composite of American society, and one size does not and cannot fit all. The Veterans Transition to Community Project is designed to be adapted to each participant with minimum of effort. Altarum developed the core technology and processes, but the servicemember works with a treatment team to develop personalized interventions that best suit his or her needs. Using the unique Life:WIRE Web-based interface, treatment is customized to the needs, language, and preferences of each client. Our solution even allows each warrior to develop a personal support group which can be automatically prompted to text, e-mail, call, or call for help in later stages of treatment as the situation dictates.

Third, our method creates a stream of data—data that can be evaluated against multiple criteria to help inform treatment, diagnoses, and progress. Often the data provide insight into related factors affecting recovery that were not readily apparent and can have tremendous benefits not only to the individual patient, but to the wider needs of the research and treatment community. Through our partnership with Chesapeake Research and Review, Inc., we have developed a model that protects human subjects and addresses all areas of Federal privacy rights and regulations. Secure, de-identified data can be extracted to isolate potential factors affecting recovery. EMA data can be extracted and compared to original assessment instruments to validate the predictability of current assessment technologies. With sufficient cross-site implementation to justify statistical validity, substrates of these data can be analyzed to identify potential differences in recovery by theater of conflict, service, gender, age, etc.

Altarum has provided the research design, funding, and analytical support of all periodic and outcomes data and is the originator and managing partner for the Veterans Transition to Community Project. But we could not conduct this project on our own. Altarum has partnered with three organizations whose expertise has been critical in the development and application of our techniques. The Pathway Home, a veterans' treatment center in Napa Valley, California, specializing in PTSD, is our research and implementation site. BrainPCheckers® provides an electronic PDA-based assessment tool for PTSD. Daily assessments are collected using an automated survey system. Our cell phone interaction, support, and messaging is provided by Life:WIRE. Each partner provides an integral piece of the project.

Altarum has learned many critical lessons as we work through the successful implementation of this research study. One size does not fit all. An early participant explained that, "he didn't feel like he could answer a question if he didn't know what all of the words were really asking." Every part of treatment must be adapted to the context of the person being served. Servicemembers and veterans are more likely to stay involved in their continued treatment when they feel the treatment was made for them and not a generic regimen. Clients are even more likely to stay involved when they feel they have input in adapting their treatment as they recover and their needs change. Finally, we learned that when the treatment meets the needs of those it serves, the clients will monitor and encourage one another. Peer support continues to proportionately increase utilization for every person involved in our research study.

The ultimate measure of success, for Altarum, is improving and protecting the lives of veterans. The following words relayed from one of Altarum's research staff members tells it all:

During our weekly status call, the director of our research partner, the Pathway Home, reported that our cell phone follow-up had made a big difference in the well-being, perhaps even the future, of one of the veterans. This warrior wasn't one of our study participants, but one of the graduates of the Pathway Home working with us to fine-tune the delivery system. He had completed his therapy. He is living at home in another State with his wife

and family and has begun normal work. Last weekend he used his phone to trigger a crisis response. But, this crisis wasn't a test—it was his. His response immediately text messaged his clinician who was able to call the veteran and de-escalate a serious episode. The episode resolved with a short visit to an emergency room rather than what seemed to be another extended relapse into a mental institution. This father is back at home with his family.

Altarum's Veterans Transition to Community Project has already changed lives. Our solution has the advantages of low cost, rapid deployment, facility for remote distribution, and adaptability to the needs and environment of those it serves. This makes it ideal for implementation across multiple systems—particularly for those suffering from mTBI, PTSD, SUDs, and MDDs. We are pleased to be able to brief this Committee on the measurable success available to our returning service-members through this innovative program. Thank you for this opportunity.

Mr. Chairman, this concludes my statement.
Thank you.

Statement of Robert Bosch Healthcare, Inc., Palo Alto, CA

Mr. Chairman and other Members of the Committee: Thank you for giving Robert Bosch Healthcare (Bosch) the opportunity to provide testimony to the Committee. Bosch, which makes the Health Buddy and T-400 remote monitoring devices, has been providing remote patient monitoring in the Veterans Health Administration (VHA) since 2003. We'd like to address the role of telehealth in improving health outcomes for veterans and reducing the need for hospital services, such as emergency room visits, inpatient admissions and re-admissions. While these are important issues in any geographic area, the shortage of physicians in rural areas and the long distances patients must travel to receive medical care make it even more important that patients with complex chronic conditions learn self-management, and for providers to prevent exacerbations of chronic illness that can lead to a hospital visit. In many cases, emergency room visits, hospital admissions and readmissions have been proven to be preventable through regular monitoring, automated patient education and the intervention of a nurse case manager.

Thirty two percent of veterans treated by the VHA live in rural areas.ⁱ The care needs of an aging veteran population (the number of veterans aged 85 and older is set to triple by 2011 compared to 2000ⁱⁱ) have led the VHA to adopt health technology sooner than many other delivery systems. We applaud this foresight. As the Committee knows, between 2003 and 2007 the VHA implemented Care Coordination/Home Telehealth (CCHT), a national initiative that enables veterans with chronic conditions to remain in their communities and reduces the need for high cost acute care. This was after extensive evaluations of the intervention in the Sunshine Network Veterans Integrated Services Network (VISN). Bosch has been providing remote patient monitoring devices to veterans since the beginning of the CCHT initiative; currently we provide 70 percent of the remote monitoring technologies that serve veterans across 21 VISNs and 123 facilities nationally. We believe that our products, and remote monitoring in general, provide an opportunity to cost-effectively extend care to rural areas without compromising clinical effectiveness.

A. The Health Buddy and T400 Programs

Bosch participation in the VHA CCHT program is based on the premise that care management supplemented by technology (the Bosch Health Buddy and ViTelCare systems) can effectively decrease costs (most commonly due to repeated and/or prolonged hospitalizations) and improve the quality of life for veterans with chronic conditions by supporting education and self-care, increasing care based on evidence-based guidelines, and improving coordination of care.

I. Clinical Focus

Key diseases of focus for veterans are Congestive Heart Failure (CHF), Diabetes Mellitus (DM), Chronic Obstructive Pulmonary Disease (COPD), Hypertension

ⁱDarkins, A., Ryan, P., Kobb, R., Foster, L., Edmonson, E., Wakefield, B., Lancaster, A. Care coordination/home telehealth: a systematic implementation of health informatics, home telehealth and disease management to support the care of veteran patients with chronic conditions. *Telemedicine and e Health* 14(10):1118–1126.

ⁱⁱIbid. Page 1118.

(HTN), Post Traumatic Stress Disorder (PTSD), and Major Depression, though other conditions are monitored as well. We believe that the successful outcomes for PTSD, depression and other mental health disordersⁱⁱⁱ demonstrate the applicability of remote monitoring to younger “Wounded Warriors” who are not likely to have age-related conditions, but may suffer from service-related mental health conditions.

II. System of Care Management + Technology

The Health Buddy and ViTelCare Programs provide effective, efficient and consistent care management based on the Chronic Care Model.^{iv} Its elements include the community, the provider system, self-management support, delivery system design, decision support, and clinical information flow. Care management is supported by an easy-to-use, in-home survey and data collection home health monitoring device (either the Health Buddy four-button appliance with text screen, or the ViTelCareT400 touch-screen monitor with adjustable audio and text screen) and an Internet-based web service for data management, care coordination, and decision support by health care providers.

III. Health Buddy and ViTelCare Systems

The Bosch devices gather information on vital signs (either through patient self report or peripheral devices such as glucose monitors), symptoms, behaviors and patient knowledge of their health conditions. The data collected is presented to the health care professional through a web-based application in a color-coded and risk-stratified format. The Health Buddy’s and ViTelCare’s scripted dialogues also provide education, feedback, and reminders for self-care behaviors, specifically diet, exercise and medication compliance. Patient responses from both the Health Buddy and T400 appliances are automatically sent to servers housed within VA data centers.

IV. Data Flow

Data from the patient takes place through traditional telephone connection, Ethernet, and, for the Health Buddy, through wireless modem (the T400 will introduce wireless capability later in 2010). Bosch is exploring additional means of expanding patient-provider connectivity that would make remote monitoring more accessible to veterans in rural areas.

V. Workflow Result

The provision of risk-stratified information to nurse case managers is a critical component of detecting exacerbations of illness early, before a hospital visit becomes necessary. Moreover, it enables case managers to target resources to patients most in need and manage a larger patient panel (a typical nurse to patient ratio in the Health Buddy Program is 1:125 or 1:75 for mental health conditions).

B. Results

The CCHT initiative has shown great success, as demonstrated by a 25 percent reduction in inpatient days, 19 percent reduction in hospital admissions and 86 percent patient satisfaction after enrollment.^v As a provider of 70 percent of the remote monitoring devices used within the VHA, we believe we have been a significant contributor to the VHA’s ability to successfully improve patients’ quality of life and transition care away from high cost acute care settings and into the home and community.

C. Opportunities for Expanding the Reach of Telehealth

The CCHT initiative represents wisdom and foresight in caring for a growing and geographically dispersed veteran population, yet we believe there is even more potential to extend care to rural areas in a clinically- and cost-effective manner with modest modifications. Research has shown that reductions in utilization for veterans in rural areas lag behind those in urban areas^{vi}, showing potential for greater returns to the VHA. Specifically, we note:

- The ability to expand the successes of the CCHT initiative has been limited by institutional constraints related to hiring staff and by the time required for development of new clinical practices and protocols.
- Currently, Health Buddy and T400 appliances are procured by the VHA prosthetics department, which is set up to purchase material goods such as tele-

ⁱⁱⁱ Ibid. Page 1123.

^{iv} Group Health Research Institute. *2006–2010 Improving Chronic Illness Care*. http://www.improvingchroniccare.org/index.php?p=The_Chronic_Care_Model&s=2

^v Darkins et al. op cit. Page 1118.

^{vi} Ibid. Page 1123.

health devices or prosthetic limbs. Telehealth, on the other hand, is a system of care and as such it includes material goods, as well as less tangible items, such as services, software, data management and data storage. Prosthetics does not have a mechanism to pay for ongoing service and other non-material fees—in essence, the current payment structure does not support wider adoption of health technology, which is increasingly becoming more virtual. We are hopeful that this barrier will be addressed by the proposed transition of procurement to the Denver Acquisitions and Logistics Center.

These suggestions aside, we again would like to take the opportunity to commend the VHA for taking a leadership role in adoption of technology as a primary component of patient care. As the largest health care system in the Nation, VHA's vision in adapting to a new technological age will lead other health care providers to do likewise, resulting in reduced costs and better patient outcomes.

D. Technology on the Horizon

The promise of telehealth ultimately resides in the notion that inter-networked technologies can create a system in which health maintenance and care are moved to wherever someone with severe disabilities or chronic illness is—particularly their home. Over time, we believe that the ability to support an individual's independence will rely on increasingly intelligent sensor-based technologies that can predict with increasing degrees of certainty that an 'adverse event' is looming. We also see a role for video as broadband-penetration rates continue to rise.

We believe the VHA's technology-based care coordination program has driven the development of the budding, U.S.-based home telehealth industry. We believe that the VHA CCHT program's next wave of growth, with its increasing sophistication of how to refine its toolbox of options for veteran health management and monitoring, will drive a new wave of innovation in the industry. Bosch looks forward to supporting the VHA in its ongoing drive to improve care for veterans by moving that care to their homes, wherever—including rural areas—those veterans are.

