

**HEARING ON AGING IN PLACE:
THE NATIONAL BROADBAND PLAN AND BRINGING
HEALTHCARE TECHNOLOGY HOME**

HEARING
BEFORE THE
SPECIAL COMMITTEE ON AGING
UNITED STATES SENATE
ONE HUNDRED ELEVENTH CONGRESS

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THURSDAY, APRIL 22, 2010

U.S. SENATE,
SPECIAL COMMITTEE ON AGING,
Washington, DC.

The Committee met, pursuant to notice, at 2:03 p.m. in room SD-562, Dirksen Senate Office Building, Hon. Herb Kohl (chairman of the committee) presiding.

Present: Senators Kohl, Wyden, Corker, and Collins.

OPENING STATEMENT OF SENATOR HERB KOHL, CHAIRMAN

The CHAIRMAN. Good afternoon. We thank you all for being here.

We'd like to thank today's witnesses for joining us, whether in person or thanks to the wonders of technology.

We are fortunate to have Senator Ron Wyden chair today's hearing on the National Broadband Plan and the impact it may have on telehealth for seniors.

Senator Wyden has always been a very active member and an outstanding member of the Aging Committee. He brings to the table his experience working with the Gray Panthers, in his home State of Oregon. He's known for his passion and leadership on the issue of healthcare. We are very pleased to have him chair this hearing today.

As we will hear, communications and medical technology has the ability to keep more seniors healthier, at a lower cost, particularly those who live in remote rural areas. There are a number of health systems and organizations in my State of Wisconsin that are putting telehealth technologies to work, such as ThedaCare, Wheaton Franciscan Healthcare, Marshfield Clinic, as well as Aurora Visiting Nurse Association.

Thanks to funding made available in last year's stimulus bill, the Federal Government is making efforts to expand our national broadband network so that more doctors and patients can take advantage of these technologies.

Through the Judiciary Committee, we are working to ensure that this is done in a way that fosters competition amongst broadband providers. Unfortunately, despite the spread of broadband, several stumbling blocks stand in the way of widespread adoption of telehealth technologies in the home. Senator Wyden and the witnesses he has invited today will shed light on this timely issue, and hopefully suggest some potential solutions.

I'm sorry that I'll not be able to stay very long at this hearing, as I have other obligations and prior commitments. But, I have full confidence in Senator Wyden, and I thank him very much for his contributions to this committee.

We turn, at this moment to the committee's ranking member, Senator Bob Corker.

[The prepared statement of Senator Herb Kohl follows:]

PREPARED STATEMENT OF SENATOR HERB KOHL

Good afternoon. First, I'd like to thank all of today's witnesses for joining us, whether in person or thanks to the wonders of technology. We are fortunate to have Senator Ron Wyden chair today's hearing on the national broadband plan and the impact it may have on telehealth for seniors. Senator Wyden has always been a very active member of the Aging Committee, bringing to the table his experience working with the Gray Panthers in his home state of Oregon. He is known for his passion and leadership on the issue of health care, and we are so pleased to have him hold today's hearing.

As we will hear today, communications and medical technology has the ability to keep more seniors healthier at a lower cost, particularly those who live in remote rural areas. There are a number of health systems and organizations in Wisconsin that are putting telehealth technologies to work, such as ThedaCare, Wheaton Franciscan Healthcare, Marshfield Clinic, and the Aurora Visiting Nurse Association.

Thanks to funding made available in last year's stimulus bill, the federal government is making efforts to expand our national broadband network so that more doctors and patients can take advantage of these technologies. Through the Judiciary Committee, we are working to ensure that this is done in a way that fosters competition amongst broadband providers.

Unfortunately, despite the spread of broadband, several stumbling blocks stand in the way of widespread adoption of telehealth technologies in the home. Senator Wyden and the witnesses he has invited today will shed light on this timely issue, and hopefully suggest some potential solutions.

I'm sorry that I cannot stay very long, as I have other obligations and prior commitments. But I have full confidence in Senator Wyden, and I thank him once again for his contributions to the Aging Committee. I'll now turn over the gavel.

OPENING STATEMENT OF SENATOR BOB CORKER

Senator CORKER. Mr. Chairman, I want to thank you for having this hearing.

Certainly, Senator Wyden always has lots to talk about when it comes to innovation.

So, I think all of us, especially after the debate we've had over the last 14 months, know that one of the things we still haven't addressed is cost. That hopefully the kind of things we're talking about today, and we'll learn from and then expand on—hopefully, these are the kind of things that help us move ahead into the future so that people throughout our country have access to quality healthcare, and yet it's being done at a much lower cost. So, I'm glad we're able to review the impediments to some of the breakthroughs today.

I want to thank you both for calling this hearing.

Certainly the wonderful witnesses that we have, not only here, but through, again, great technology, from other places. So, thank you very much.

The CHAIRMAN. Thank you, Senator Corker, well said.
Senator Wyden.

OPENING STATEMENT OF SENATOR RON WYDEN

Senator WYDEN. Thank you very much, Mr. Chairman, and for all of your leadership and, particularly, putting the field of aging on the side of innovation. All through the health reform debate, when we talked about the future of healthcare reform, you constantly kept coming back to the question of how we look, not just over the next few years, but into decades ahead. This gives us a chance to do that. I thank you very much for your leadership, and it's a pleasure to be able to serve with you.

To my friend Senator Corker, we talk often about healthcare, and I think one of the other two aspects of this hearing that you two illustrate is how important it is that the big issues, like healthcare, be dealt with in a bipartisan way. We didn't get enough of that in the healthcare reform, but there are a lot of us who believe, in the years ahead, there are going to be a lot of opportunities to prosecute this question of the future of American healthcare in a bipartisan way.

You, Mr. Chairman and Senator Corker, set a very good example for it. I thank you both for always making sure, in the Aging Committee, we don't get lost in some sort of petty partisan kind of discussion. I thank you both.

Today's hearing is about how new healthcare technologies that use a high-speed Internet connection can better meet the health needs of America's seniors. These new technologies can save the older people a trip to the doctor or, in tragic instances, to the emergency room. I'm of the view that a number of these technologies will save Medicare money in the years ahead.

So, for the purpose of this hearing, I'm going to call these new technologies "e-care." It is also a subject that the Federal Communications Commission is focused on. I want to take a minute to just talk a little bit about the possibilities for e-care. I'm going to use a couple of devices to highlight it. I'm old enough to report that I always call them "gadgets."

But, what we're talking about, folks, for example, using is a device like this. It isn't on the market just yet. But, what this is, is, in effect, a high-tech Bandaid. It attaches to a patient's skin, and it's loaded with drugs that are administered in the exact way the physician prescribes; that's wirelessly. That means that a doctor can vary the dose, based on the information the doctor receives. The patient doesn't have to go into the doctor or the pharmacy to change his or her prescription.

So, then we go to the next device. We call this, I guess, some version of a Health Pal. This device connects to other devices that would measure a patient's blood pressure and glucose levels, obviously areas that any physician treating a diabetic patient wants to know about. It then wirelessly uploads the data to an electronic medical health record that is monitored by a healthcare professional.

So, then we go to one of my favorites, a third device. In effect, this is a product that's available on the commercial market now. So, what you do here is, you, in effect, put your finger in it, something along the lines of what I'm doing. This particular product measures the pulse and the level of oxygen in a patient's blood. So, right here in this small device is critical information for those pa-

tients who have cardiovascular disease. Then, this device transmits the data to what the physicians call their "SmartPhone" in an electronic medical record. So, then you get a readout that, in effect, confirms to your spouse that you have been eating properly and exercising.

So, the last device that I would bring before the committee politely, if I could characterize it, attaches to a patient's chest to monitor the heart. This will, in effect, produce data that uploads to a physician, enabling that physician to call the patient if there is a problem. So, this small device can help prevent a heart attack among America's seniors.

Now, many of these devices are targeting the population that have chronic conditions. These are the folks who might make up perhaps 10 percent of those on Medicare, but whose care each year accounts for up to 85 percent of all Medicare spending. I'm of the view that e-care could be a huge step forward in improving the care for older people and lowering costs to Medicare as a government program.

At the same time—this is a matter that Senator Corker and I, I think, talked about during our times of negotiating how we might pursue cost containment. I want to make clear that I'm not of the view that everybody ought to be able to run up with a gadget and say, "OK, let's now make this eligible for Medicare reimbursement." This is going to have to involve a program to really scrutinize the cost-effectiveness of the various products, and what they will do for the patient.

We know that Don Berwick has been nominated to head an important office in this area, the Federal Medicare Program. I think that he ought to examine e-care as one of his top priorities.

The reason I feel so strongly about this is that the Medicare reimbursement system is fundamentally flawed. We saw, in the course of the Medicare Reform debate, that, in many respects, it rewards inefficiency and it generally only pays the older people when they go, in person, to the physician's office. So, in effect you have a system that literally rewards volume, rewards people who come in, whether or not that might be the appropriate approach. You will have, in my view, if that persists, greater expense for Medicare and the taxpayers than you would have if you looked to the kinds of technologies that I've offered the committee here today, that could allow people to be cared for, I think, in a more constructive way at home; produce better quality and more timely care at a cheaper price to taxpayers.

So, among other things, I hope today's hearing will help spark rethinking the way Medicare pays doctors. At this point, Medicare barely acknowledges the existence of e-care. Medicare spends over \$400 billion a year; about 2 million is spent on these kinds of technologies. In particular, I think these e-care technologies could reduce hospital readmissions, which could, in turn, save the Medicare program from substantial costs, in the years ahead.

Now, what all these devices and technologies require is access to a high-speed Internet connection, what is commonly referred to across the country as "broadband." So, that's why today's hearing is also going to consider the national broadband plan that was developed by the Federal Communications Commission and delivered

to the Congress last month. That was a plan that was mandated by the Congress, and it demonstrates that high-speed Internet is the backbone of e-care. The broadband plan is the blueprint for how to make a high-speed Internet connection as ubiquitous as a phone line or an AMFURTHERMORE signal.

Now, in the 20th century, infrastructure that enabled the movement of goods, people, and protons is what separated developed countries from the developing ones. In the 21st century, broadband infrastructure will be a central component of the competitiveness of any country and its producers. According to the broadband plan, one in three Americans do not have broadband at home. The United States lags far behind other countries in the adoption of broadband and e-care that would improve healthcare and save hundreds of billions of dollars in health costs.

So, there are big, big traffic jams and unpaved roads on the information superhighway that is called the Internet. That is holding back improvements in healthcare for those in rural and tribal areas. Seventy percent of small physician offices which aren't located in metropolitan areas don't have access to an affordable broadband service that is available in the metropolitan areas. Many of these providers have to pay three or four times the price for the same broadband service that an urban provider pays.

I'm of the view that Congress and the Federal Communications Commission ought to deploy significant public resources to deliver broadband to areas where the private market has not yet been able to deliver the service. Moreover I believe that rural healthcare providers ought to receive assistance in purchasing broadband services if they are not affordable in their area. Only when the country has a reliable broadband infrastructure and policies in place to encourage the development and deployment of innovations in healthcare will it be possible to transform the healthcare system that is today all about "sick-care" into one that finally focuses on healthcare and keeping our folks well. Achieving that will allow America's older people the ability to more comfortably age in place.

Let us turn now to colleagues who have a longstanding interest in this. I know Senator Collins and I talk often about healthcare, and continue to have an interest in a number of bipartisan healthcare reforms.

Senator CORKER, would you like to say anything else, to begin?

Senator CORKER. That's the longest opening statement I've ever given so—

Senator WYDEN. Well, I— [Laughter.]

I tell you, you're a role model for us, and we thank you for it.

Senator COLLINS, any remarks.

OPENING STATEMENT OF SENATOR SUSAN COLLINS

Senator COLLINS. Thank you. Thank you, Mr. Chairman, for calling this important hearing to examine the ways that we can unlock the value of broadband to bring telehealth and other patient monitoring technologies into the home.

According to the National Broadband Plan that the FCC submitted to Congress last month, the development of the broadband network and health information technologies has the potential to truly transform healthcare, simultaneously enabling better out-

comes and lowering costs. The FCC found that increased use of electronic health records and remote patient monitoring, alone, could reduce healthcare costs by more than \$700 billion dollars over the next 15 to 25 years. Moreover, in addition to the significant cost savings, these technologies have the potential to improve the quality of life for our seniors dramatically by allowing them, as you've pointed out, "to age in place" in the comfort and security of their own homes and their own communities.

A recent study of remote patient monitoring programs at the Veterans Administration found that it resulted in a 19-percent reduction in hospital admissions, a 25-percent reduction in bed days of care, and an 86-percent patient satisfaction rate. Moreover, the average cost per patient was \$1600 per year, as compared to more than \$77,000 a year for nursing-home care.

Mr. Chairman, the benefits of these technologies, both in terms of cost savings and quality of life, are clear. They assume particular significance in rural States, like mine, the State of Maine, which have serious shortages of primary care and specialty physicians, and where patients often have to travel long distances to receive healthcare services. Yet, the United States continues to lag far behind other industrialized nations in the adoption of these critically important technologies.

This afternoon's hearing will give us the opportunity to examine whether implementation of the National Broadband Plan will provide for more widespread adoption of these technologies. It'll also give us the opportunity to identify barriers to using telehealth and remote patient monitoring devices that rely on a broadband connection. Finally, it will help us to determine what more the Federal Government can do to increase access to these new and rapidly developing technologies.

Again, thank you, Mr. Chairman, for calling this afternoon's hearing.

Senator WYDEN. Thank you very much, Senator Collins.

I think—all three of us represent States with substantial rural areas, and I think this is particularly important, to highlight your point, that this can compensate for the distance from a lot of major health facilities.

Senator COLLINS. Absolutely.

Senator WYDEN. I appreciate the points.

Let us go now to our first witness, who, due to the challenges of the airlines, is going to speak to us from London. I note that he comes today to talk about technology, through the use of modern technology. We welcome Dr. Mohit Kaushal. He is the Digital Healthcare Director at the Federal Communications Commission. He led the healthcare team that contributed to health sections of the broadband plan delivered to the Congress. This was mandated by the Recovery Act. He's also an ER physician by background.

Why don't we begin with you, Doctor?

**STATEMENT OF MOHIT KAUSHAL, DIGITAL HEALTHCARE
DIRECTOR, FEDERAL COMMUNICATIONS COMMISSION,
WASHINGTON, DC**

Dr. KAUSHAL. Senator Wyden and others on the Senate Special Committee on Aging.

I hope you can hear me.—

Senator WYDEN. We missed a little bit of your first few words, but we're hearing you now.

Dr. KAUSHAL. Great. So, thank you for the introduction. As you said, I head up the healthcare team for the National Broadband Plan at the FCC. As you know, Congress mandated that the FCC prepare a National Broadband Plan. The plan also recommends how broadband can be harnessed to tackle important national purposes, including healthcare.

Improving America's health and America's healthcare system is one of the most important tasks for the Nation. Healthcare already accounts for 17 percent of U.S. GDP; and By 2020, it will top 20 percent. 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—

Senator WYDEN. Doctor, we just lost you. Can you hear me?

Dr. KAUSHAL. I can hear you perfectly.

Senator WYDEN. OK. If you can back up one sentence. We just lost you, about a sentence ago.

Dr. KAUSHAL. Got it.

So, healthcare already accounts for 17 percent of U.S. GDP; and by 2020, it will top 20 percent. 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 Nation's healthcare costs. By 2040, there will be twice as many Americans over 65 as there are today.

But, there's a set of broadband-enabled health information technologies, both now and emerging, that can mitigate many of these issues and reduce the cost of care while improving clinical outcomes—to the study that claims that remote monitoring could generate net savings of approximately \$200 billion over 25 years, from just four chronic conditions. Although economic studies like these are open to criticism due to the difficulty in quantifying savings, the Veterans Hospital System has implemented its Care Coordination Home Telehealth Program, which has resulted in improved clinical outcomes and significant cost savings.

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 on every metric used to measure adoption. The plan identifies some of these barriers that prevent the use of broadband-enabled health solutions, and provides specific recommendations that government should undertake to remove them.

So, with respect to the e-care technologies that enable "aging in place," these barriers and subsequent proposed solutions fall into three main categories. Firstly, the connectivity gap; broadband is either missing or too expensive in some cases. Second, misaligned economic incentives; the prevailing fee-for-service reimbursement system pays for volumes rather than outcomes, and hence prevents

many of these technologies from being paid for. Third, outdated regulations, created back when our only interactions with physicians were in their offices, not via remote monitoring and videoconferencing.

So, let me now discuss each one of these briefly.

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 14 to 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 this is over 65, but what we do know is that the over-65s are poor adopters of broadband, estimated to be 35 percent, as compared to the national average of 65 percent.

My focus and my team's focus has been primarily on the connectivity issues for healthcare 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 likely originate in a healthcare facility of some description.

Our analysis highlighted that some providers are not served by existing mass-market broadband infrastructure, and others are facing large disparities in the price of broadband. The plan addresses this issue by proposing a revamp of the FCC's Rural Healthcare Program, which, capped at \$400 million per year, is the largest sustainable fund for healthcare connectivity within the government.

Second, although the connectivity supply problem is an issue, 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 their workflow, but don't fully capture the economic gains they create through improved clinical outcomes. The plan recommends that well-understood use cases of e-care technologies should be incented with outcomes-based reimbursement. In addition, novel technologies should be tested for their clinical efficacy, as well as within novel payment models, in order to ascertain their economic value.

Senator WYDEN. Doctor. If you wouldn't mind, I—I've just been summoned, because the Budget Committee is trying to wrap up, and apparently they can't do it unless I arrive.

Could I impose on my colleagues, Senator Corker and Senator Collins, who I know will very ably handle this in my absence?

Senator CORKER. Absolutely.

Senator WYDEN. Very good. We'll see you shortly.

Doctor, my apologies. I'll get back as soon as possible, to all our witnesses.

Thanks.

Dr. KAUSHAL. Thank you very much. So, let me continue then.

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 systemwide expenditure reductions under CMS's fee-for-service model.

Third, there are a range of regulations that prevent e-care solutions from being adopted. State licensing, credentialing, and privileging rules prevent physicians from providing remote broadband-enabled care. Patient safety must be addressed by ensuring that

physicians are suitably skilled, but regulations must not hinder the innovation and gains promised by health IT, and should, therefore, be reevaluated.

In addition, there is a great deal of regulatory uncertainty regarding the convergence of telecommunication and medical devices, which is preventing private-sector investment and innovation. Further regulatory transparency within the area must be provided to industry. The FCC and FDA both recognize this need, and we're working together to address it.

So, in conclusion, there are multiple barriers that must be resolved in order to develop the ecosystem of broadband-enabled health IT. Technology alone will not solve our healthcare challenges. It must be coupled with payment reform, innovation in service delivery, and improved regulatory transparency before we will recognize the benefits of all these technologies. Thus, any government approach to solve these issues must be coordinated, not only across the government, but with the private sector and the entire healthcare community.

I thank you all for giving me the opportunity to speak today.
[The prepared statement of Dr. Kaushal follows:]

**Written Statement of
Mohit Kaushal MD MBA
Health Care Director
Federal Communications Commission**

**“Aging in Place: The National Broadband Plan and
Bringing Health Care Technology Home”
Hearing before the
Special Committee on Aging
United States Senate
April 22, 2010**

Good afternoon Chairman Kohl, Ranking Member Corker, and distinguished Members of the Senate Special Committee on Aging. My name is Dr. Mohit Kaushal and I head up 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 National Broadband Plan also recommends 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% of U.S. gross domestic product (GDP) and by 2020, it will top 20%.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

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).

already accounts for 75% of the nations health care costs.² 5% of Medicare beneficiaries, who in most cases have one or more chronic conditions, constitute 43% of Medicare spending.³ By 2040, there will be twice as many Americans older than 65 as there are today.⁴

But there's a set of broadband-enabled health information technologies (health IT), both now and emerging from development, that can mitigate many of these issues and reduce the cost of care while improving clinical outcomes. One study claims that remote monitoring could generate net savings of approximately \$200 billion over 25 years from just four chronic conditions. Although economic studies like these are open to criticism due to the difficulty in quantifying savings, the Veterans Hospital System has implemented its Care Coordination / Home Telehealth Program (CCHT) for 32,000 veteran patients with chronic conditions. The program has resulted in a 19% reduction in hospital admissions and a 25% reduction in bed days for those veterans who are admitted. There is also a significant cost saving associated with these improved clinical outcomes; the CCHT Program, at \$1,600 per patient per year, costs far less than the VHA's home-based primary care services, at \$13,121 per patient per year, and nursing home care rates, at \$77,745 per patient per year.⁵

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 Adam 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>.

Even though these technologies hold great promise, the US 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.⁶

The Broadband Plan identifies some of barriers that hinder the adoption of broadband-enabled health solutions and provides specific recommendations the government should undertake to remove them.

With respect to the e-care technologies that enable “aging in place,” these barriers and subsequent proposed solutions fall into three main categories:

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

Let me now discuss each in detail:

⁶ CATHY 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.

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. But what we do know is that the over-65s are poor adopters of broadband, estimated to be 35% as compared to the national average of 65%⁷. 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 sets the ambitious goal of providing access for every American to robust and affordable broadband service. This will be achieved by a once-in-a-generation transformation of the Universal Service Fund, which includes the creation of a "Connect America Fund" as well as expanding "Lifeline Assistance" and "Link-Up America". Mobile solutions are also an important piece of the Broadband Plan's strategy for home broadband: the proposed Mobility Fund will help bring all states to an equal level of "3G" wireless coverage.

My focus has been primarily on 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. Larger providers must purchase "Dedicated Internet Access" (DIA) to meet their quality of service requirements, but those are often 4X or greater in price than mass market solutions. This cost issue is further

⁷ Chapter 9, "Adoption and Utilization", National Broadband Plan

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 a revamp of the FCC's Rural Health Care Program. The program, capped at \$400M per year, is the largest sustainable fund for health care connectivity within the government. We are proposing to create a permanent infrastructure fund as well as continuing to subsidize monthly internet charges. 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 in order to apply the evolving "Meaningful Use" criteria to FCC subsidy programs.

Secondly, although the connectivity supply problem is an issue, 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 they create 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 outcome-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 are economic incentives for physicians of various specialties to collaborate together and better manage elderly patients with chronic conditions that often require multiple specialty input. 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, requested by Congress, to propose specific programs and reimbursement changes (also suggested in the plan) that will help realize the value of e-care technologies.

Third, there are a range of regulations that prevent e-care solutions from being adopted. State licensing, credentialing, and privileging rules prevent physicians from providing remote broadband-enabled care across state lines and even at other hospitals than their usual place of work. Patient safety must be addressed by ensuring that physicians are suitably skilled – but regulations must not hinder the innovation and gains promised by health IT. To this end, the plan recommends that credentialing, privileging, and licensing rules must be re-evaluated.

In addition, there is a great deal of regulatory uncertainty regarding the convergence of telecommunication and medical devices, which is preventing private sector investment and innovation. At one end, general-purpose communications devices such as smartphones, videoconferencing equipment, and wireless routers are regulated solely by the FCC. At the other, medical devices, including life-critical wireless devices such as remotely controlled drug-release mechanisms, are regulated by the FDA. However, the growing variety of medical applications that leverage communications tools to transmit information presents challenges to the current federal regulatory regime. Convergent devices and the applications within this grey area vary greatly. Some are intended to be used by clinicians and others by consumers. Some, if they fail, would likely result in significant adverse events; others may only represent a mild inconvenience. Further regulatory transparency within the area must be provided to industry. The FCC and FDA both recognize this need, and are working together to address it. A workshop,

in conjunction with industry, is being planned by the end of this summer, with the aim of better framing the problem and proposing distinct solutions.

There are multiple barriers that must be resolved in order to develop the ecosystem of broadband-enabled health IT. Technology alone will not solve our health care challenges; it must be coupled with payment reform, innovation in service delivery, and improved regulatory transparency before we will recognize the health benefits and cost savings promised by these technologies. My experience in entrepreneurship, clinical medicine, public health, venture capital, and now within government has cemented how complex the delivery of health care is. Significant barriers and misaligned incentives must be removed before the private sector can start producing solutions. Thus 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.

Senator CORKER. Thank you very much for that outstanding testimony, and especially in different time zones and different places.

Our second witness is Dr. Farzad Mostashari, if I pronounced it correctly. Dr. Mostashari serves as Senior Advisor with the Office of National Coordinator of Health Information Technology at the U.S. Department of Health and Human Services. His latest work has been on the implementation of health IT provisions and the American Recovery and Reinvestment Act. He holds both a medical degree and a master's in public health. Congratulations.

We welcome you here and thank you for your testimony.

STATEMENT OF FARZAD MOSTASHARI, SENIOR ADVISOR TO THE NATIONAL COORDINATOR FOR HEALTH INFORMATION TECHNOLOGY, U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES, WASHINGTON, DC

Dr. MOSTASHARI. Thank you, Ranking Member Corker, Senator Collins.

I'm Dr. Farzad Mostashari, as you said, Senior Advisor to the Office of the National Coordinator for Health Information Technology. Thank you for the opportunity to testify before you on HHS's efforts to harness telehealth, to transform healthcare and improve health, and support aging in place by America's seniors.

The American Recovery and Reinvestment Act of 2009 made a historic investment in health information technology, providing up to tens of billions of dollars in incentive payments for certain Medicare and Medicaid providers who adopt, and are meaningful users of, certified electronic health record technology.

These are unprecedented, outcomes-oriented investments. The goal is not just for providers to purchase and install health information technology, but to make improvements in health and healthcare through use of health IT. This means our goals are to increase healthcare quality and safety, reduce disparities, engage patients, improve efficiency of care, and enhance care coordination. It's abundantly clear that telehealth can make substantial contributions in all of these areas and help elderly patients remain in their homes and avoid costly and unnecessary hospital admissions.

As Senator Collins pointed out, the Department of Veterans Affairs has dramatically decreased unnecessary hospitalization through a wide-ranging effort to help veterans manage chronic conditions at home. Hospital use decreased 25 percent overall, and 50 percent for patients in highly rural areas, by linking 32,000 chronically ill veterans with healthcare providers and care managers through video phones, digital cameras, messaging, telemonitoring.

There are also many private-sector examples of these innovations. Using home-based monitoring and Web-based care to improve medication management, an effort at Group Health in Washington State almost doubled the number of hypertensive patients with controlled blood pressure and made care more convenient and responsive to patient needs. Kaiser Permanente has reported on increased use of e-visits, increasing primary care capacity.

Technologies for telehealth and e-care, and the payment and delivery structures to support them, are evolving rapidly in the marketplace. New offerings combine telehealth technologies with innovative service delivery platforms that have the potential to trans-

form care for the elderly, making it more responsive and available to support aging in place.

I'll give one example. A company named American Well partners with health plans to deliver just-in-time video-supported e-Care to patients with an Internet connection. The model leverages a large network of patients and providers, who can connect securely on the Internet, along with existing plan licensing arrangements, provides malpractice coverage, and takes advantage of distributed excess physician capacity.

A wide range of initiatives and programs across HHS aim to support innovation in telehealth in three areas: video consultation services, remote patient monitoring, and secure sharing and reading of patient information, like radiographic images.

Secure sharing and remote reading of patient information, professional interpretations of tests or specimens that require practitioner reviews, need not be done at the same place that the care is delivered. Radiographic images on high-speed channels can improve care coordination and reduce the risk of medical errors. This already occurs widely under Medicare, and is treated no differently than services provided onsite at the medical facility where the patient is located. Many radiological and pathological services, including reading X-rays, interpreting EKGs, examining tissues specimens, are routinely provided in this manner.

Video consultation services that require face-to-face contact can occur across sites of care, or in patient homes, addressing geographic and other barriers to care, including low mobility. Medicare pays for telehealth services for beneficiaries seeking care in certain rural and non-urban provider sites, including critical-access hospitals, rural health clinic, and federally qualified health centers. This includes telehealth services provided by physicians and non-physician practitioners; for initial and followup inpatient consultations; office or other outpatient visits; and pharmacologic management, among other clinical services.

In addition, States are encouraged to use the flexibility inherent in the Medicaid program to create innovative payment methodologies for services that incorporate telehealth technology.

Home monitoring can place daily metrics of patient's health, weight, blood pressure, other vital measures in patients' and providers' hands, improving chronic-care management and patient engagement; avoiding unneeded hospitalizations for patients with heart failure and other chronic conditions. CMS already pays for some examples of this with home-event cardiac monitoring and Holter monitoring.

The Health Services and Resources Administration funds six telehealth networks focused on improving outcomes and access for seniors through telehealth care and telehome monitoring. Initial evidence of the impact of HRSA's telehealth programs is encouraging. From 2006 to 2007, the number of patients achieving glycemic control, a key indicator of successful diabetes management, rose from 34 to 42 percent.

Since 2004, AHRQ has awarded over \$260 million in grant funding for health IT, including 23 telehealth projects in 16 States. For example, supported by funding from AHRQ, patients at Saint Vincent Hospital, in Billings, MT, share realtime information about

weight, blood pressure, and blood sugar with physicians across phone lines with the simple touch of a button. I heard, this morning, from Cleveland Clinic about their dramatic shift away from episodic to continuous care using these methodologies.

While there is evidence that certain telehealth applications can improve care and reduce certain unnecessary costs, more information and experience is needed about which strategies are most effective, and under what circumstances; how to integrate telehealth with traditional healthcare delivery, and reduce barriers to adoption; and how to assure privacy and security of health information shared through these technologies. Patient safety issues will be carefully considered by the Food and Drug Administration to address the challenges and safety risks of using medical devices that were not designed for use in this setting, or by lay users in the home.

Over the upcoming months and years, there will be considerable investment in innovative care-delivery models and payment approaches that can foster telehealth. New models for deploying and integrating telehealth technologies will be developed and tested through the HITECH Beacon Community Grant Program. This initiative will support at least 15 vanguard communities, many of them predominantly rural, with high levels of electronic health record adoption to lead the way in demonstrating concrete and measurable improvements in areas such as patient experience, health disparities, and national high-priority health conditions, such as blood pressure and diabetes control, and reducing unnecessary hospitalizations. Many applicants propose to integrally involve telehealth in these efforts.

But, most significantly, looking forward, the Affordable Care Act allows providers to utilize a series of new and innovative delivery system and payment reforms, such as accountable-care organizations, bundled payments, and value-based purchasing, which incentivize high-value healthcare that focuses practitioners on the quality, not quantity, of care. As providers do so, we expect that the use of innovative telecommunications technology in medical care will be fostered.

The new Center for Medicare and Medicaid Innovation has given explicit authority to test innovative payment and service delivery models, which may include care coordination for chronically ill individuals at risk of hospitalization through telehealth, remote patient monitoring, care management, and patient registries.

These new payment approaches mean a move away from fee-for-service payment toward a more outcome-oriented approach, as Senator Wyden suggests. This allows for adoption and use of technologies and care delivery approaches that improve care, engage patients, and reduce unnecessary spending.

We don't yet have all the answers. They will come from continued market-based technology innovation, paired with more results-oriented payment and thoughtful study to capturing the lessons and evidence from ongoing efforts.

Thank you for the opportunity to testify today.

[The prepared statement of Dr. Mostashari follows:]



**Testimony Before the
Senate Special Committee on Aging**

Statement of

Farzad Mostashari, MD, MPH

Senior Advisor,

*Office of the National Coordinator for Health IT
U.S. Department of Health and Human Services*

April 22, 2010

Good afternoon Chairman Kohl, Ranking Member Corker, and distinguished Members of the Senate Special Committee on Aging. I am Dr. Farzad Mostashari, Senior Advisor to the Office of the National Coordinator for Health Information Technology (ONC) in the U.S. Department of Health and Human Services (HHS). Thank you for the opportunity to testify before you on HHS efforts to harness telehealth to transform health care and improve health and support aging in place by America's seniors.

Introduction

The American Recovery and Reinvestment Act of 2009 made a historic investment in health information technology (IT) providing up to tens of billions of dollars in incentive payments for certain Medicare and Medicaid providers who adopt and are meaningful users of certified electronic health record technology.

The proposed Health Information Technology for Economic and Clinical Health Act (HITECH) definition of meaningful use establishes a purposeful trajectory of technology adoption and use to engage patients, improve quality and enhance care coordination. The initial stage of meaningful use focuses on electronically capturing and tracking essential health information, building the foundation for later stages focused on advanced clinical processes, such as telehealth, to demonstrate improvements in health care quality, safety and efficiency. By defining health IT in a flexible modular way, as outlined in the Initial Set of Standards and Certification Interim Final Rule, the program supports the development of innovative technologies that can help providers meet the increasingly rigorous requirements of meaningful

use. There is a need to define the standards and privacy and security protections to support these new technologies and modalities, potentially including mobile health devices and tools for remote monitoring.

These are unprecedented, outcome-oriented investments. The goal is not just for providers to purchase and install health IT—computers, software, internet connections, telemedicine—but to make improvements in health and health care through use of health IT. This means increasing health care quality and safety, reducing disparities, engaging patients, improving efficiency of care and enhancing care coordination. It is abundantly clear that telhealth can make substantial contributions in all of these areas, providing mechanisms to share scarce resources and bringing expertise and information to people wherever and whenever it is needed. And it is equally clear that many of the benefits delivered by telehealth or “e-Care”—increasing access to specialty services in rural areas, enabling remote monitoring of patients in their homes, and otherwise facilitating individuals’ access to clinicians who are remote from the patients—will all help elderly patients remain in their homes and avoid costly and unnecessary hospital admissions. Delivery of critical health care services in patients’ communities and homes can reduce costs born by patients, providers and health insurers and increase patient satisfaction. Elements of e-Care include:

- **Video consultation services** make specialty services available to rural and other underserved areas, improving health care quality and reducing disparities while also increasing convenience for patients. Nearly 50 million people living in rural areas face challenges accessing needed health care today.

- **Home monitoring** can place daily metrics of patients' health—weight, blood pressure and other vital measures—in patients' and providers' hands, improving chronic care management and patient engagement. Early detection of problems made possible with real time information, but not imaginable through office visits at six-month intervals, can help avoid unneeded hospitalizations for patients with heart failure and other chronic conditions.
- **Secure sharing and remote reading** of patient information such as radiographic images on high speed channels can improve care coordination and reduce the risk of medical errors.

Strong evidence backs these claims. My testimony describes how public and private sector programs have harnessed technology and care delivery innovation to promote patient access and support quality and continuity of care.

The Department of Veterans Affairs (VA) has dramatically 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 providers and care managers through video phones, digital cameras, and messaging and tele-monitoring.

¹ Jia 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.

² Darkins 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.

Using home based monitoring and web-based care to improve medication management, an effort at Group Health in Washington State almost doubled the number of hypertensive patients with controlled blood pressure and made care more convenient and responsive to patients' needs.³

These results are mirrored in an HHS study which found that three out of four home health agencies used telehealth applications for activities such as remote monitoring of vital signs and medication reminders for certain patients (such as those with heart failure or chronic obstructive pulmonary disease), use of cameras to document and forward wound images to wound care specialists and physicians, and enable virtual visits by therapists (e.g., physical therapist, speech-language pathologists) with patients. Reported telehealth benefits included: improved medication compliance; increased clinician and patient confidence for patient safety in their home; improved identification of and response to clinical changes; fewer emergency department visits and rehospitalizations; and an ability to keep patients at home rather than being admitted to a nursing home. Integration of telehealth data into electronic health records (EHRs) varied with the application and across agencies.⁴

Technologies for telehealth and e-Care and payment and delivery structures to support them are evolving rapidly in the market. New offerings combine telehealth technologies with innovative service delivery platforms that have the potential to transform care for the elderly, making it more responsive and available to support aging in place. American Well, for instance, partners with health plans to deliver just-in-time video-supported e-Care to patients with an internet

³ Green, B. "Effectiveness of Home Blood Pressure Monitoring, Web Communication, and Pharmacist Care on Hypertension Control: A Randomized Controlled Trial," *JAMA*, 299 no. 4 (2008): 2857-2867.

⁴ Kramer, A., et al. "Understanding the Costs and Benefits of Health Information Technology in Nursing Homes and Home Health Agencies: Case Study Findings." June 2009. <http://aspe.hhs.gov/daltcp/reports/2009/HITcsf.htm>

connection. The model leverages a large network of patients and providers who can connect securely on the internet along with existing plan licensing arrangements, and takes advantage of distributed excess physician capacity.

The mobile health sector is evolving particularly rapidly and producing innovative health applications for consumers using mobile devices such as smart phones. Some of the most interesting applications combine mobile health and remote monitoring, for instance, through the use of remote sensors to continuously monitor patients' heart rhythms or blood glucose level.

HHS Telehealth Initiatives

A wide range of initiatives and programs across HHS aim to unleash the transformative potential of telehealth in all three of the areas highlighted: video consultation services, remote patient monitoring and secure sharing and remote reading of patient information like radiographic images.

Video Consultation Services can deliver specialty and other consultation services across sites of care or in patients' homes, addressing geographic and other barriers to care, including low mobility. Medicare pays for telehealth services for beneficiaries seeking care in certain rural and non-urban provider sites including critical access hospitals, rural health clinics and federally qualified health centers. This includes telehealth services provided by physicians and non-physician practitioners for initial and follow-up inpatient consultations, office or other outpatient visits and pharmacologic management, among other clinical services.

Each year the Centers for Medicare & Medicaid Services (CMS) reviews the list of qualified telehealth services and considers adding or deleting services in response to public input. In evaluating whether certain services should be added to the list of Medicare telehealth services each year, CMS categorizes the requests into one of two groups and then examines their appropriateness for telehealth delivery based on the requirements of the applicable category. First, for services that are similar to existing services on the telehealth list, CMS considers whether the roles and interactions of the patient and practitioner in the requested services are similar to those of existing services. Second, for services that are not similar to existing services on the telehealth list, CMS considers whether the requested services, when delivered via a telecommunications system, result in similar diagnostic findings or therapeutic interventions as compared to face-to-face delivery of the same service.

In CY 2009, Medicare paid approximately \$2.4 million under the Medicare Physician Fee Schedule for approximately 33,000 services explicitly identified as telehealth services. This was a substantial increase over approximately 21,000 services in CY 2008.

In addition, although the Medicaid statute (Title XIX of the Social Security Act) does not recognize telemedicine as a distinct service, States are encouraged to use the flexibility inherent in Federal law to create innovative payment methodologies for services that incorporate telehealth technology. For example, subject to Federal approval of a Medicaid State Plan Amendment, states may reimburse the physician or other licensed practitioner at the distant site and reimburse a facility fee to the originating site. States can also reimburse any additional costs

such as technical support, transmission charges, and equipment. If these additional costs are separately billed and reimbursed, the costs must be linked to a covered Medicaid service. Any State wishing to cover/reimburse for telemedicine services must submit a State Plan Amendment to CMS for approval.

Home Monitoring creates a real time feedback loop between patients and providers with the support of digitally-enabled devices such as glucose monitors to support chronic care management. The Health Services and Resources Administration (HRSA) funds six telehealth networks focused on improving outcomes and access for seniors through telehome care and telehome monitoring. In recognition of the potential of this technology, HRSA will also fund two telehealth resource centers specifically focused on providing technical assistance and evaluating telehomecare programs. These two centers will play a key role in identifying successful telehomecare practices and sharing those findings widely.

In all, HRSA supports 25 telehealth networks through an \$11.6 million grant program which provided services in 96 clinical areas, across 690 sites in underserved rural areas. This included the delivery of pediatric services in 191 communities and mental health services in 159 communities that otherwise would not have had access to these critical specialty services. Since 2005, these grantees have supported 1,275 service sites across the country.

Initial evidence on the impact of HRSA's telehealth programs is encouraging. In 2006, the telehealth networks began measuring outcomes for diabetic telehealth services. From 2006 to 2007 the number of patients achieving glycemic control—a key indicator of successful diabetes management—rose from 34 percent to 42 percent.

Supported by funding from AHRQ, patients at Saint Vincent Hospital in Billings, MT share real-time information about weight, blood pressure and blood sugar with physicians across phone lines with the simple touch of a button. AHRQ has shown that aging Americans directly benefit from technology that connects them with their doctors and that meets their healthcare needs.^{5,6} Ongoing AHRQ projects and research will provide critical information about how to deliver mobile and telemedicine technologies and services in the most effective and efficient way to improve the quality of health care. Since 2004, AHRQ has awarded over \$260 million in grant funding for health IT, including 23 telehealth projects in 16 states.⁷

Secure sharing and remote reading of radiology images occurs widely under Medicare and is treated no differently than services provided on-site at the medical facility where the patient is located. Many radiological and pathological services, including reading X-rays, interpreting electrocardiogram tracings, and examining tissues specimens, are routinely provided in this manner.

In addition to supporting the goals of improving health care quality and efficiency and making care more patient-centered, the Department's telehealth programs also meet critical workforce and rural health needs: strengthening partnerships among health care providers, supporting new platforms for continuing education, modernizing health care infrastructure and facilitating the

⁵ *Barriers and Drivers of Health Information Technology Use for the Elderly, Chronically Ill, and Underserved*, Structured Abstract. November 2008. Agency for Healthcare Research and Quality, Rockville, MD. <http://www.ahrq.gov/clinic/tp/hitbartp.htm>

⁶ *Impact of Consumer Health Informatics Applications*, Structured Abstract. October 2009. Agency for Healthcare Research and Quality, Rockville, MD. <http://www.ahrq.gov/clinic/tp/chiapptp.htm>

⁷ http://healthit.ahrq.gov/portal/server.pt?open=514&objID=5585&parentname=CommunityPage&parentid=2&mode=2&in_hi_userid=3882&cached=true&tech=1214012

recruitment and retention of health care professionals, especially in rural areas and other remote care settings. Physicians participating in the rural learning network established by AHRQ's Project ECHO in New Mexico reported having greater confidence treating chronic and complex diseases for patients unable to directly access specialist care, increased physician job satisfaction and lower turnover for nurses and other office staff.⁸

In addition to HHS programs, expansion of the Federal Communications Commission's Rural Health Care Pilot Program will make a marked contribution to the nation's telehealth capacity, funding the build-out of broadband telehealth networks linking hundreds of hospitals in 16 states. Broadband investments will address the "connectivity gap" for small, medium and large practices that could create a barrier to meaningful use.

Conclusion

Several issues that could potentially hamper broad adoption will need to be addressed in the near term including: privacy and security concerns, licensing and credentialing, and questions about the regulatory approach for these evolving technologies. Patient safety issues will be carefully considered by the Food and Drug Administration, to address the challenges and safety risks of using medical devices—that were not designed for use in this setting or by lay users—in the home.

While there is evidence that certain telehealth applications can improve care and reduce certain unnecessary costs, more information is needed about which strategies are most effective and under what circumstances, how to integrate telehealth with traditional care delivery and reduce

⁸ Arora S, et al. "Academic Health Center Management of Chronic Diseases through Knowledge Networks: Project ECHO." *Academic Medicine* 82(2) (2007): 154-160.

barriers to adoption, how to implement telehealth approaches at enterprise and community scale and how to assure privacy and security of health information shared through these technologies. It is clear that the outcomes achieved by the VA and Group Health were not the result of simply purchasing and deploying telehealth or mobile health tools, but were due to the thoughtful pairing of emerging technologies with new care delivery processes. Future stages of meaningful use will provide a critical opportunity to advance effective telehealth as a way to increase patient engagement, improve chronic care outcomes and reduce unnecessary costs including avoidable hospital readmissions and emergency room use. A goal-based and not tool-specific approach will be important in this evolving market, to promote continued innovation of technologies and care delivery models.

New models for deploying and integrating telehealth technologies will be developed and tested through the HITECH Beacon Community Grant Program. This initiative will support at least 15 vanguard communities with high levels of electronic health record adoption to lead the way in demonstrating concrete and measurable improvements in, among other things, patient experience, health disparities and national high priority health conditions such as blood pressure and diabetes control and unnecessary hospitalizations; all areas that can be addressed through telehealth. Many will depend on innovative uses of telehealth for improving care for rural areas, stationary populations (e.g., home-bound patients and patients in correctional institutions and long term care facilities), and regions with a shortage of health professionals.

New payment approaches and care delivery models can also support appropriate and effective care in patients' homes and communities facilitated by telehealth technologies. Looking forward,

The Affordable Care Act (ACA) (P.L. 111-148) allows providers to utilize a series of new and innovative delivery system reforms, such as accountable care organizations, bundled payments, and value-based purchasing. As providers do so, we expect that the use of telecommunications technology in medical care may be beneficial in care models that focus on efficient and high-quality care to patients. In the context of current law and national, state, and local policies, the Department strongly supports innovative care delivery models, including the appropriate use of telehealth services, which incentivize high-value health care that focuses practitioners on the quality, not quantity, of care, and results in improved health outcomes.

The new Center for Medicare and Medicaid Innovation (CMI) is given authority to test innovative payment and service delivery models. These models may include care coordination for chronically ill individuals at risk of hospitalization through telehealth, remote patient monitoring, care management and patient registries. Efforts to improve medication therapy under Medicare Part D may also include use of telehealth approaches. In addition, ACA:

- Allows CMI to explore a teleICU model for electronic monitoring of ICU patients from physicians at remote sites and study the use of telehealth services in treating behavioral health problems.
- Allows accountable care organizations to advance evidence-based care, improve care coordination and improve quality and efficiency, which can include telehealth and remote patient monitoring.
- Allows use of remote monitoring for eligible medical practices in the Independence at Home Demonstration Program, for medication review by pharmacists, and in the Community-Based Collaborative Care Network Program.

Similar to the concept of meaningful use, what many of the new payment approaches share is a move away from fee-for-service payment towards a more outcome-oriented approach. This allows for adoption and use of technologies and care delivery approaches that are proven to work in improving care, engaging patients and reducing unnecessary spending. We don't yet have all the answers. They will come from continued technology innovation paired with more results-oriented payment and thoughtful study to capturing the lessons and evidence from ongoing efforts.

Mr. Chairman, thank you for the opportunity to appear before you today.

Senator CORKER. Thank you very much for your testimony.

A matter of fact, since we typically start here with the other side of the aisle, I'm going to start with you. Even though—

Senator COLLINS. Uh-oh.

Senator CORKER [continuing]. We're on the same side of the aisle.

Senator COLLINS. Does that mean you consider me to be a Democrat?

Senator CORKER. Not at all.

Senator COLLINS. I hope not. [Laughter.]

Senator CORKER. You're a great partner.

Senator COLLINS. Thank you, Mr. Chairman. How's that sound?

Senator CORKER. Very good.

Senator COLLINS. I thought it might.

I'd like to discuss, with our witnesses, a couple of challenges to telehealth and monitoring, using broadband technologies. One of the problems is, this technology holds the greatest promise for rural areas and senior citizens. Yet, if you look at rural areas and senior citizens, those are the two categories where broadband and digital literacy is the lowest. Rural areas tend to have been left behind. I know we're trying to fix that. Seniors tend—not all of them, but as a group—tend to have a lesser degree of digital literacy than younger Americans.

The cost issues perhaps can be solved through subsidies, but those cultural issues and infrastructure issues are more complicated. So, I'd like both of you to comment on the challenges faced by the lower rate of digital literacy among seniors, and the lower availability of broadband in our rural areas.

As I said, it's ironic, because that's where telemedicine could be most helpful.

Director, why don't we start with you.

Dr. KAUSHAL. Great. I only picked up a part of that question, I'm afraid—you're talking about—and the elderly, and then some of the complex issues that they face, correct?

Senator COLLINS. I was talking about the fact that the senior population is less likely to have access to broadband technologies in their homes.

Dr. KAUSHAL. Right. Let me just talk about some of the statistics that some of my colleagues at the National Broadband team came up with after a lot of analysis. So—you're very correct—so, the national average for adoption of broadband is 65 percent. The over-65s, on average, are only 5 percent, in terms of adoption of broadband. This is due to multiple reasons, but digital literacy leads the way, at 29 percent. The relevance of digital content is second, at 26 percent. Cost is third, at 22 percent.

This is very different than the national averages of other age groups. So, they have very specific reasons why they're not adopting these technologies. We spent a lot of time thinking through that.

Then the other issue is just, in rural areas, there's just—penetration of broadband.

So, the plan, in its totality, has come up with a number of proposed recommendations to solve these—both supply and demand-side issues.

So, if we talk about the infrastructure side first—as you know, one of the goals is to promote 100 percent penetration of 4 megabits per second down, and 1 megabit per second up. It will do that in a number of ways. First of all, making it just easier to access poles and rights-of-ways for the private sector. Also, lower the cost of deployment trenching is very expensive, so proposals to allow—if the ground is opened up, for whatever reason, that fiber should be laid there.

Then, on the adoption side, which we all think is a much more complicated issue, although the adoption is lower than average in the over-65s, there's a huge disparity within that group, as well. So, what really is required is a lot of research. A number of centers are doing this, and we've worked with a couple of them. How do we provide innovative solutions? Healthcare is one of them. By providing applications to let the elderly manage their conditions better, to stay in contact with their loved ones, we really feel that adoption will be increased.

Then, go back to the question of reimbursement. Physicians and providers really have to be incented to trial and test as many of these technologies as possible within this elderly population. Unfortunately, by just doing one, won't solve the problem at all. We have to really push forward on all these different avenues. The issue is complex, as you outlined.

Senator COLLINS. Thank you.

Doctor.

Dr. MOSTASHARI. I think the supply issues will, we trust, be dealt with. I agree with you, that the demand side is a key issue. As Dr. Kaushal pointed out, people have to have a reason for getting online. I applaud the broadband plan's strategy, focusing on rural health providers. For every primary care physician with an electronic health record who adopts technology, there are thousands of patients—elderly patients, patients with chronic conditions—who will have a reason to go online.

My parents use the Internet faithfully to be in touch with their providers, to look at their lab results, to ask for a refill, to ask a question. It is those—enabling those health providers to use electronic health records, to have patient portals that will create the demand on the side of the elderly, those with chronic conditions.

So, I think that the approach that the broadband plan takes, in terms of focusing on the health sector, is appropriate.

Senator COLLINS. Thank you.

Mr. Chairman, do you want me to continue, or do you want to switch off?

Senator CORKER. Well, let's just go back and forth.

Senator COLLINS. Sure.

Senator CORKER. I was very interested in what you were saying about being able to share capacity, if you will, in the medical system by using this type of technology. If somebody doesn't have that much of a load, they could deal with a patient. But, I also understand that what you do is very complex, that it's really not just science, but also art, knowing the patient, sort of following through with a patient. How much of that, if any, is diminished where you actually—especially in this case of not just using this technology,

but sharing physicians that may not have familiarity with the patient, themselves?

Dr. MOSTASHARI. I think that is—it's a very perceptive point. Clearly, having a patient-centered medical home is an important aspect to provide continuity of care and the knowledge of the patient. The home doesn't necessarily need to be provided by one provider, though. One of the, I think, important innovations that is happening is, through the use of information technology, making sure that everybody who touches the patient has access to all the information. Not necessarily all the medical information, at least; not necessarily the years of relationships that have built up between the patient and provider, which is critically important, but at least all the medical facts are available to everybody who touches the patient. That is one of the really important advantages of electronic health records, compared to paper—their availability, wherever and whenever the provider needs them.

Senator COLLINS. Let me follow up on an issue that many hospitals in my State have brought to my attention. As part of last year's Recovery Act, Congress made a major investment of some \$19 billion to increase the meaningful use of electronic health records on the part of both hospitals and physicians. Hospitals can collect an initial bonus, and an extra payment each time a Medicare patient is discharged.

But, a number of the smaller financially strapped hospitals in my State are struggling to find the funds necessary to build the infrastructure that they would need to meet the meaningful use or criteria. These are the "tweener" hospitals, we think of them as. They're too big to be critical access hospitals, or they don't qualify as critical access hospitals for other reasons. But, they're not large enough to enjoy any economies of scale or to have the resources to do the investments that are needed.

If these smaller hospitals fail to meet the meaningful user criteria, then they not only are ineligible for any of the bonus payments, but they'll actually, eventually, be subject to penalties. Are you aware of any assistance, any grant programs or sources of Federal funding, that could help these hospitals cover their initial startup costs? I will tell you, when they first started coming to me, I said, "Oh, we put all sorts of money in the stimulus bill for this purpose, \$19 billion." I thought surely that would be a source of funding, but it's proving not to be.

Dr. MOSTASHARI. We are carefully looking at all sectors in the marketplace, and quite concerned that digital divides not develop in any of the critical sectors, whether it's safety nets, critical-access hospital, rural health hospitals, small practices, primary care practices. There are many, many, many segments within our healthcare—diverse and heterogeneous healthcare environment that could face significant challenges, whether it's because of the lack of capital and access to capital markets, or human resources, technologic know-how.

We have put in place many programs to support different slices of those communities. We are expecting the marketplace to step in, for example, on the credit side with the hospitals, who are—as a group tend, to be more financially capable than, for example, small practices.

I take your point about the tweeners, that there may be hospitals that are bigger than the critical-access hospitals, and smaller and less financially robust than the larger centers.

Recently, the House and Senate passed the extension of the meaningful-use payments to hospital-based outpatient providers who could—and those are additional dollars that the hospital—could be directed toward the hospital, on the outpatient side, building out their information systems and EHRs.

So, we do have, through the Regional Extension Center Program, which is our single largest investment from ONC's onetime ARRA expenditures—we have established network of Regional Extension Centers to help provide project management, technical assistance know-how, education to primary care providers and smaller practices, community health centers, and we recently added a supplement for critical access and rural hospitals with fewer than 50 beds. So, we will continue to monitor. If it emerges—we're doing—working with the American Hospital Association on surveys to monitor the rates of adoption and meaningful use among hospitals, and if something emerges—a gap there emerges, we will be constantly looking for ways to improve that.

Senator COLLINS. Thank you.

Senator CORKER. Director Kaushal? Are you tuned in?

Dr. KAUSHAL. I am.

Senator CORKER. Good. I didn't know if you were operating your BlackBerry or listening to us. I just thought— [Laughter.]

I'd check.

You mentioned something that all of us talked about a great deal over the last year, and that was paying for outcomes. Obviously, you know, in our fee-for-service program right now, there's really not a real way to deal with this type of technology in that sphere. Yet, all of us, I'm sure, have been down on the Senate floor, at one time or another, talking about the fact that our payment system needs to be based on outcomes. But, could you describe a little bit how that might work? Just—you know, not 8 pages, but a paragraph or two about how that might work in this sphere. Candidly, even in the traditional sphere of physician services. [No response.]

OK. So, you might want to start again, or maybe not—take the mute button off, possibly, if—

Dr. KAUSHAL. Can you hear me now?

Senator CORKER. You're at—

Senator COLLINS. Yes.

Senator CORKER. Yes, sir.

Dr. KAUSHAL. Hello?

Senator CORKER. Yes, sir.

Senator COLLINS. We've got you back.

Dr. KAUSHAL. Great. So, as I was saying—on this, because—the recommendation that—

I think Farzad was spot-on, in terms of—we need to really trial and experiment with many of these technologies to understand the economic impact,—accountability—organization. These are a range in different payment model pilots which are being undertaken. What we suggested is that these technologies explicitly be trialed in those pilots to understand whether they do result in improved economic outcomes. We don't want to carte blanche reimburse for

every single technology, because that would bankrupt the system. We have to really understand what works or not. Then the next step is, if things work, there has to be a mechanism to implement them, which is what some observers see out there as some of the disconnect over the last couple of years.

Then the second way—my second point to answer the questions that there are already great news cases out there. We've already talked about the VA and the great data that they received. News cases from systems like that should be analyzed to understand what worked, what didn't work, and is there a method to translate them into outcomes-based reimbursement, perhaps by the extension of meaningful use? The important caveat there is, of course, that the VA is an integrated healthcare system and has a very different incentive mechanism.

Senator CORKER. So, if I might ask you the same question, just following up it seems to me that, at present—I think all of us would love to see a system that, instead of paying for volume, paid for outcomes, but it's hard to find that, right now, isn't it?

Dr. KAUSHAL. Sorry, I. [Laughter.]

Dr. MOSTASHARI. You know, there's the famous story about the drunk looking under the street lamp for his keys, and, you know, they asked him, "Where—did you lose them here?" He said, "No. But, it's—the light's good over here." That's been a limitation in our ability to measure quality—for so long has been the information that we had access to in order to measure quality.

I believe that the healthcare ecosystem will be a dramatically different one if we succeed—and I believe that we will succeed, in the next 5 to 10 years—of creating a health IT infrastructure that can collect information—structured information electronically about the things that matter, that really affect health and patient satisfaction and care coordination, and that we will be able to use that health IT infrastructure to produce meaningful quality measures that can form the basis for payment innovations.

So, I think this—the environment is changing. In many ways, HITECH was the first and important cornerstone for that to develop.

Senator COLLINS. Just one final question. We've seen, in the past few years, an increase in cybercrime. We've seen breaches of Internet security that have caused people to be subject to identity theft and lose personal financial information. While the development of broadband networks and health technologies clearly has the potential to transform healthcare in a very positive way, doesn't it also raise some new concerns about the privacy and security of some of the most sensitive personal information that anyone has—that is, their medical records? How do we address those concerns? Whoever I can hear. [Laughter.]

Dr. KAUSHAL. I'll take—computing as applied to other industries. There've been huge gains, both in terms of productivity and the—. But, you're very correct, healthcare has a very specific security and privacy issue. Having said that, so does finance. The reason some of the real unknown questions, when we think about, What does constitute a medical grade network?—and this is one of the regulatory uncertainties when we do think about this convergence—so, this is one of the major topics the FDA and we are

working on. We're right in the early stages, but we hope to really define the privacy and security issue in a much more tangible way.

Senator COLLINS. Thank you.

Doctor.

Dr. MOSTASHARI. It is No. 1, two, and three, in terms of concerns that we have to be attentive to, and leave no stone unturned in doing so. There are policy, clearly, issues that need to be determined. We're working with the Health IT Policy Committee that was created under the HITECH legislation and has been tremendously helpful in setting a framework for us, not only in meaningful use, but also now we're moving into the privacy and security realm. We have to work with practices.

Ultimately, it's not just about the—whether you have the right policies, it's not about whether you have the right laws, it's not about whether you have the right technology, it's about whether they're implemented. So, the best technology in the world, or the best policies in the world do you no good if, in the provider's office, they don't use the technology appropriately. That's one of the things that, in addition to technology innovation—we just awarded a research award to 20 investigators from 12 topflight universities around—on our security research. We're working diligently. We have, now, a chief privacy officer for the Department of Health and Human Services, and the Office of National Coordinator.

So, we're really tackling it from a policy side, from a research side, from a technology side, from a standards perspective, around encryption, around identify assurance, and so forth. We're merging these activities with the—over all the administration activities around cybersecurity. But, we're also looking at on-the-ground—boots-on-the-ground in the doctor's offices and using the Regional Extension Centers as a key point of education to make sure that the practices do a risk—a security risk assessment and take steps—practical steps to reduce the risk of the network.

Senator COLLINS. Thank you.

Thank you, Chairman. I yield.

Senator CORKER. We thank you both for your testimony, and I appreciate your input. We look forward to our staffs following up with you in the future. Again, thank you for doing what you're doing to advance something that I think we all think is very promising. So, thank you.

I'll say goodbye to our friend in London. I hope you have an enjoyable evening.

With that, we'll bring the second panel up.

But, thank you, Doctor. Thank you, Director. [Pause.]

So, I want to welcome each of you.

I apologize for the way this hearing is. This is kind of the way things are in the Senate, especially when votes ended 3 hours ago, and a lot of people ran to airports and to do other things. But, you're testimony is all part of a public record. When we advance legislation here, we have to have hearings that take place. Our staffs follow up. So, this is all for good. Let me introduce each of you.

Our first witness on the panel is Eric Dishman. Mr. Dishman represents the Continua Health Alliance, a consortium of industry leaders in the field of telehealth and e-care technologies. Mr.

Dishman is a longtime, well-known advocate for personal healthcare and innovation. We thank you.

Our second witness is Dr. Robin Felder. Dr. Felder is a Professor of Pathology and Associate Director of clinical chemistry at the University of Virginia School of Medicine. He served as a founding Director of the Medical Automation Research Center, MARC, from 2002 to 2008. He holds a Ph.D. in biochemistry. Thank you.

As you can imagine, I'm especially proud to introduce our third witness, Richard Kuebler. Mr. Kuebler is telehealth department head at the University of Tennessee Health Science Center. We thank you for the advancements you all are making there in this field. He has worked in telehealth for over a decade, and can share the experience of providers using this technology.

So, we welcome all three of you. Thank you for your testimony.

STATEMENT OF ERIC DISHMAN, INTEL FELLOW, INTEL CORPORATION, GLOBAL DIRECTOR OF HEALTH INNOVATION AND POLICY, INTEL DIGITAL HEALTH GROUP, SENIOR POLICY ADVISOR, CONTINUA HEALTH ALLIANCE, SENIOR FELLOW, CENTER FOR AGING SERVICES TECHNOLOGIES, WASHINGTON, DC

Mr. DISHMAN. Great. Well, thank you, Mr. Chairman. It's great to be here.

I have been working on aging-in-place technologies for the last 20 years of my life. I'm really thrilled to have this testimony today.

It's ironic. Almost 6 years ago to this day, I spoke to this very same committee, to a different Congress, and said a lot of the same things I'm going to say today. I'm going to repeat them today, with a bit more urgency, given that we're moving quickly toward 2017 and the demographic crisis that we face.

Senator CORKER. I wasn't here then. I thank you for repeating things.

Mr. DISHMAN. I have— [Laughter.]

I will come back 6 years from now, but I hope we've made progress by then, and I believe we will have.

Before I introduce myself, I want to introduce two technologies to you, because in—frankly, they're more important than I am. The first is this small device here. We probably—if I look around this room and took a survey, a large number of us would have an experience with a loved one—a parent, a grandparent—who have had a fall in their home. Falls, in the United States, cost about \$44 billion, annually. One out of three people over the age of 65 fall each year. It's a classic problem that leads people to institutionalization, if not death.

I believe, I don't know, but through our research, we're trying to discover, that 70 to 80 percent of falls could be prevented in the first place through some simple technologies like this. I've had this in my pocket. It's been tracking not only my number of steps per day, but also micro movements that are looking at, "Am I becoming more unbalanced and more unstable, or changing the rate of speed in my walking norms around the kitchen, or around the home, or around the hallways of Congress?" This kind of data's never been collected in the real world before.

We're collecting this kind of data with hundreds of households in Oregon, where I live, and hundreds of households in a lab in Ireland. The hope is that by collecting real-world data, not bringing patients into a clinic encounter and saying, "Are you feeling more unstable on your feet?" and, "How have you been doing with falls in the last few weeks?" when they can't remember that. That real-world data will help us understand and prevent the vast majority of those falls from ever happening in the first place.

I want to give you a second example. This is a laptop-sized device. If you know much about Parkinson's disease, about 1.5 million people in United States with Parkinson's, costs us about \$27 billion annually. The disease is incredibly variable. The fact that we are sending Parkinson's patients to a once-every-6-month visit to a doctor, who may or may not capture them, in that exam room for that 15 minutes, with an accurate assessment of how their tremor is really doing and how the disease is progressing, and then we will

proceed to give them very expensive medications, that have terrible side effects, is almost unethical, especially when we can use simple technologies at home, where patients could do a series of activities, moving pegs back and forth and speaking into this device, to look at changes that are going on in their voice, and get a much more accurate trend about the disease progression. That's a game-changing, simple technology that could change how we treat Parkinson's today, and prevent a lot of overmedication, and a lot of expense and side effects and hospitalizations. This is work that we did with Andy Grove, the cofounder of Intel, who has Parkinson's, and his foundation. Very promising research.

Those three words, "very promising research," are what I would describe for the field right now. Not a lot of products, but lots of very promising research. I've spent 20 years doing social science research of aging-in-place technologies and e-care technologies. At Intel, where I have my day job, we have tested over two dozen in-home pilots, with seniors, of different technologies, like these two that you've seen today.

We have lived with and observed 1,000 elderly households in 20 countries, understanding their needs and trying to figure out how e-care technologies could be used in ways that no one's imagining right now. We have funded well over 100 university grants in this area, out of Intel. We have helped to start several not-for-profits, including Continua, that I represent today, which is a not-for-profit advocacy group and standards organization, to make sure that these home-based technologies for e-care are interoperable, and are built on standards and advocate for these. The Continua is now 227 companies strong.

That's the good news. The bad news is—I mean, my career is great. My research career is wonderful, and I'm very happy on that regard. Personally, I cannot use these technologies to help take care of my own aging parents, who live far across the country from me in North Carolina, because there are neither the incentives nor the infrastructure to allow their doctors to get this data and interact with them or with me in any compelling way. I can't use the own products and research that my own company is creating to help take care of my own parents. That's why I'm here today.

Four big barriers, many of them I'm going to reiterate from things you've heard from other people today. The first is imagination. As I make Hill visits, most policymakers do not understand there's an imagination gap about what is available today already, and what is possible. If they have an imagination for e-care or telehealth or telemedicine, they mostly think about physician-to-physician video consultation, which is certainly part of it, but that's not—that's very different than a Parkinson's device that's helping to track your disease, or a simple wearable technology that may prevent the vast majority of falls. So, we need to do something to help policymakers and your colleagues understand what's possible and what's real today.

There's also no agency—and 6 years later, this is the main thing I asked for 6 years ago—no one in Federal Government owns driving the e-care/telehealth agenda. No one owns putting together a national telehealth and e-care strategy. I've worked with the European Union, 10 years ago, and I've worked with nine European

countries, who each have their own national strategy for e-care and telehealth to the home, for chronic disease management and independent living. But, we need a national coordinator for e-care, here in the United States, to get our act together and catch up with a lot of what the rest of the world is doing.

I often call this the Y2K Plus 20 Commission, because by 2020 we've got a lot of baby boomers retiring, and we need the kind of energy and attention that the Y2K Commission brought, where we brought the private sector, government leaders, and not-for-profits—at an executive level—to own this agenda and move it forward quickly as a national infrastructure.

So, imagination is the first.

Second—we've talked about it already a little bit—are incentives. We pay for reactive medicine today. With few exceptions, we pay for sickness and injury care, not health; we pay for face-to-face visits. When I show these devices to clinicians and they work on our teams, they're, at first, skeptical of the technology, then they see what it can do, and they say, "Oh my gosh. I can't treat patients without this data, because I'm flying blind in a once-a-year visit with them. I just hope that I actually have their paper chart or their electronic record in front of me." The kind of data that you have doesn't exist in a face-to-face encounter, because you're pulling real-world trend data. Then they have that moment where they say, "But- I can't use any of this. There's all these reasons why I can't. The most fundamental is- I only get paid, and the whole system only works if you come into my office." So, incentives are certainly key to that, and we've heard a lot of that today.

The third is investment. Our medical research dollars today in the United States are spent primarily on great drug therapy and diagnostics. We will spend—if you come back to my example with falls—we will spend tens of billions of dollars on the next great piece of hospital equipment, to look at even higher resolution of the bone break that you got from falling in your home, or of creating a new drug that may be incrementally better for painkillers once you've already broken your hip, but we will not spend tens of millions of dollars on interventions that may prevent 70 to 80 percent of falls from ever happening in the first place. That's completely backwards.

There is no major funding bucket. My recommendation here is, the United States needs to match what the European Union invested, of 1 billion euros that they invested 3 years ago, into this area of e-care and independent living technologies for seniors. There's no major program at the National Institutes that own this. There are a few grants here and there. But, it's happening by accident, not by intentional strategy.

The fourth is infrastructure. You've heard some about broadband today, and there are two kinds of infrastructure I want to close with. Technology infrastructure and broadband being key to that, but workforce infrastructure is the other key.

Our infrastructure today is preparing professionals and professional places, clinicians and hospitals. It is not preparing consumers and home to be part of the care force that we need to do in the 21st century.

So, one is, we need this next-generation broadband network. We need to make sure that the FCC's broadband plan, which we have to admit is one chapter of a large broadband plan, and is likely to dissipate if somebody does not watchdog this, many of the people who created this broadband plan are not going to be at the FCC in 4 months. So, I keep asking myself, how is this going to be implemented and carried through? Because the very brilliant people who created it will no longer be around. We've got to make sure we follow through and don't let this just be a chapter in the broadband plan, but there's an implementation plan to move this technology all the way to the home.

The second is, we have to train—and this is what Europe is well ahead of us in doing—volunteers, family members, and e-care virtual workers, both professionally and clinically trained and non-clinically trained, to use these technologies and integrate it into workflow. It's not the technology alone; it's the technology plus the workforce.

So, in conclusion, I'd say, global aging leaves us no choice but to invent these new care models. There is no scenario in which we're going to suddenly create enough doctors and nurses and bedspace to catch up with the age wave, or even to add the uninsured to the current system. We need to do for global aging and what I would call "gray technologies" here what we have done for global warming and green technologies. Invest in it. Catalyze it. Make sure that U.S.-based companies are going to catch up and compete with Europe in what's likely to be a large market opportunity. This will help us take care of our own demographic in aging population, as well as help give us an advantage to sell those capabilities to the rest of the world.

Thank you.

[The prepared statement of Mr. Dishman follows:]

Testimony of Eric Dishman

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Global Director of Health Innovation & Policy,
Intel Digital Health Group

Senior Policy Advisor, Continua Health Alliance

Senior Fellow, CAST,
Center for Aging Services Technologies

Before

The U.S. Senate Special Committee on Aging

On

**“Aging in Place: The National Broadband Plan and Bringing
Health Care Technology Home”**

April 22, 2010

Introduction and Perspectives

Good afternoon Mr. Chairman and members of the Committee. It is an honor to testify here on such a socially and economically important issue as bringing healthcare and independent living technologies to the home to help Americans age-in-place with dignity and great quality of life from wherever they choose.

My name is Eric Dishman, and I am here first and foremost as a family caregiver—as a grandson and son. I am eager to help my own parents in North Carolina to live wonderful, healthy retirement years that they deserve—and that they themselves tried to give their own parents in spite of huge challenges upon all of us to cope with many incidents of Alzheimer's, stroke, heart disease, and crippling falls. Like so many Americans—almost 50 million according to AARP and the National Alliance for Caregiving¹, I am living the need for innovative solutions that can help my aging parents to stay healthy and happy at home and out of the hospital. Given the more than \$250 billion worth of care we're collectively providing each year as sons, daughters, and neighbors, there is just too little national attention—and too many barriers—to building aging-in-place inventions, infrastructures, and industries that we will all need eventually.

I am also here today with a professional perspective of having researched and funded aging-in-place technologies since 1992 wearing many different hats. I am pleased to testify on behalf of the Continua Health Alliance (www.continuaalliance.org), a non-profit, open industry coalition of 227 healthcare, technology and medical device companies who have joined together in collaboration to improve the quality of health through the use of telehealth, remote patient monitoring (RPM), and independent living technologies for what we call "e-care." Continua is dedicated to establishing interoperable personal health solutions with the knowledge that extending those solutions for "electronic care" into the home fosters independence, empowers individuals, and provides the opportunity for personalized health and wellness.

Furthermore, as a social scientist who has run Intel Corporation's research and innovation efforts around aging-in-place and e-care for more than a decade now, I have seen firsthand that these technologies, when designed intentionally to fit into the home and to connect families with professional providers, can dramatically help with prevention, early detection, behavior change, and self-care. As co-founder and inaugural Chair of the not-for-profit advocacy group CAST, the Center for Aging Services Technologies (www.agingtech.org), I have evaluated many promising aging-in-place solutions being researched in universities and companies that now need to move from laboratories to the lives of seniors and families across the country. And as a patient advocate over the past 22 years of my life, I have personally used internet, social networking, and telehealth technologies to help improve the quality of life not only for many elderly cancer patients, but also for their families and their often frustrated, over-worked professional providers.

Thus, I believe the questions raised by this hearing are vitally important to answer: What are we doing as a nation to prepare for Global Aging, and how do we make sure investments in fundamental infrastructure like broadband and health information technologies (HIT) are ready to support e-care in the home? How are we making sure that payment reforms and new care coordination incentives at CMS and in the private market encourage doctors and nurses to care for seniors and patients in their own homes when medically appropriate? How can we accelerate the research and commercialization of aging-in-place technologies to let e-care best practices advantage our nation's families, businesses, and economy? Finally, how do we make sure that seniors and the programs that serve them are not left behind as our nation continues to invest in healthcare reform and innovation?

We must make sure our seniors and those who care for them have access to the proven benefits that technology can bring rather than being precluded from this access because of outdated practices and payment structures inherent in today's government and private reimbursement systems. We must make sure our country's investments in HIT and broadband do not stop at the hospital door but extend to the home and to seniors and their caregivers in the community. In short, we need a 21st century healthcare system for the *entire* care continuum that uses modern technologies to deliver care wherever it is most needed, appropriate, and cost-effective...which will increasingly have to be in the home, at work, and on-the-go for seniors and all people who need access to care.

The Y2K+20 Challenge

We live in demographically challenging times. According to the U.S. Census Bureau, back in the year 2000 there were about 600 million people worldwide who were 60 years old and above. By 2025, those numbers will double to 1.2 billion people. And by 2050, a date not so far from now, we will have more than two billion people over the age of 60 on our planet.ⁱⁱ Our government, like many in Europe are already doing, needs to catalyze a public-private response to this Age Wave that rivals or exceeds what we did for the Y2K challenge that faced our country.

Ten years ago, I referred to this demographic imperative as the "Y2K + 10" challenge because 2010 was when the first Baby Boomers reached official retirement age. In fact, back in 2004, almost six years from this day, I testified to this very Committee on this very topic, calling for a national commission to get our act together and to reinvent long term care *before* we reached the crisis.ⁱⁱⁱ But alas, 2010 is here with a wake-up call recession, and we are still largely unprepared as a nation—technologically, educationally, financially, and personally.

I carry the same message today to a different Congress but with more urgency and a new deadline: we need a 2020 vision and implementation plan for preparing for the Age Wave that uses technology and workforce retraining to bring healthcare home. Let's call it "Y2K+20" to evoke the kind of national momentum, leadership, and public-private

collaboration that it both deserves and needs to be successful. And let's challenge ourselves to move 50 percent of care done in institutions today to the home by 2020!

Simply put, we do not have enough physicians, nurses and other health care providers to meet the needs of an aging population. This is why looking at ways to cost-effectively deploy HIT is, and will be, of growing importance for our national healthcare strategy. Care-shifting from expensive clinical/institutional settings to the broadband-connected home and skill-shifting from scarce medical professionals to trained family caregivers, community workers, and engaged patients themselves—especially for many kinds of long term care and chronic disease care that do not require emergency intervention—are crucial to building a 21st century healthcare system that can be available and affordable to everyone. And government leadership to bring the various agencies, non-profits, and industries together to build, test, and incentivize this national e-care infrastructure is greatly needed if we are to meet the Y2K+20 challenge.

Definitions and Benefits of “e-Care”

Policy makers, industry members, providers, and patients may mean very different things when using the phrase “Health Information Technologies.” HIT in our nation’s stimulus and reform conversations has come to be almost synonymous with “Electronic Health Records” (EHRs)—with an almost universal presumption that everything we’re talking about is getting doctors to share data about their patients online with electronic equivalents of paper charts. But there are many other kinds of HIT, including personal health technologies, telehealth technologies, telemedicine technologies, aging-in-place technologies, decision-support tools, remote patient monitoring (RPM) technologies, and many more. Thus, Continua has used the term “e-care,” short for “electronic care,” to refer to the class of health information technologies that might facilitate any kind of virtual visit or electronic connectivity outside of traditional office visits among patients, family members, and medical professionals.

“E-care” could mean secure text messaging between a senior and a doctor to change a medication dosage, an audio chat, or a full video visit. It can also mean remote patient monitoring with in-home or mobile devices that can help providers track trend data like blood pressure and weight that seniors take themselves on a regular basis. E-care may also mean using electronic connectivity to help patients remember to take a medication, capture a vital sign, or view customized content sent to them by their doctor to teach them about managing their own disease.

None of this effort is about replacing the traditional doctor-patient relationship, but it’s about *enhancing* and *extending* it to more people and regions of the country. Our nation must simply harness the benefits of interoperable technologies connected by fixed, wireless, or broadband solutions—that have helped improve and extend every other industry—to improve chronic care and long term care. These kinds of technologies allow patients and care providers to use real-world, remotely collected data to make decisions on a continuous basis, rather than waiting for office visits or emergency situations. By

tracking vital signs and other health data on a more regular basis and sharing it through secure systems, e-care offers many beneficial capabilities:

- 1) **Empowering patients** with tools that help them make sense of—and to manage—their own care;
- 2) **Collecting real-world biological and behavioral data** and trends in the home with alerts for out-of-norm situations;
- 3) **Facilitating virtual visits** with providers, when appropriate, via a range of electronic media;
- 4) **Enabling social networking**, awareness, and care support from family and friends who are nearby or distant;
- 5) **Personalizing care plans** and educational content for each patient based on their needs, preferences, data, and capabilities, and;
- 6) **Triaging precious medical resources** to enable the right amount of care to occur in the right place and time.

Just as “email” became a new way of interacting with other people that didn’t replace all other forms of communication such as phone calls and letters, e-care uses new technologies to create a new way of providing care that complements—but doesn’t replace—all clinic visits. Hospital and clinic visits will always have their place. But today, we too often use those expensive institutional settings for every healthcare need, even when those institutions can be misused (e.g., treating non-urgent problems in emergency rooms across America) or even dangerous for patients (e.g., sending seniors with routine, chronic health issues to a hospital during an H1N1 outbreak).

By monitoring their own data from home, seniors (or patients of any age) and their caregivers become more engaged in self-care. E-care 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 checkups. In addition, providers have more information to make medical decisions rather than only a single or quarterly office visit where they may or may not have captured data that accurately reflects what is really going on with their patient the other 364 days a year.

Like email when it was new, e-care may be frightening to some who don’t understand it or have access to it at first. As with all new inventions, e-care technologies will have both positive and negative consequences for society. But again like email, we will look back some day on e-care solutions and wonder how we ever did effective and ethical care without them. We will learn and develop “best practices” for e-care—and invest in comparative effectiveness studies to know the right balance of in-home, in-clinic, and e-care consultations for different conditions and needs—as with all new medical interventions. But these technologies will ultimately help us move beyond a quantity

oriented system (e.g., number of visits done or tests/drugs prescribed) to a quality one—with new relationships and delivery models that we need to explore, evaluate, and embrace as quickly as possible.

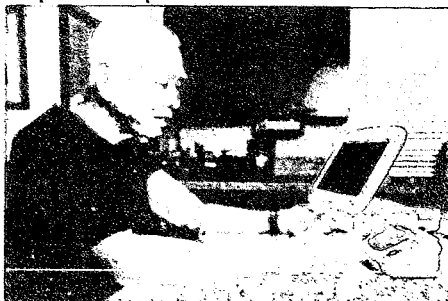
E-care Examples from Intel's Research with Seniors

For more than a decade now, Intel social scientists, clinicians, and engineers have conducted ethnographic fieldwork in the homes of more than 1000 elderly citizens in 20 countries to help us know what problems our technologies needed to address.^{iv} This longitudinal research has entailed observing these seniors and their family caregivers (who themselves have often been dealing with multiple chronic conditions, high stress, and other health issues) in their homes, at clinic visits or hospital stays, at their grocery stores or exercise clubs, and wherever health and wellness intersects with their lives. We have benefitted enormously from the wisdom and support in our research from seniors themselves, from two several-hundred household cohorts—at the TRIL Centre (www.trilcentre.org) in Dublin, Ireland and at the Oregon Center for Aging and Technology (www.oracatech.org) in my hometown of Portland, Oregon—where new prototypes are tested in their homes with their families and providers.

Also, we have now conducted more than 14 in-home pilots of aging-in-place and e-care technologies, covering a broad range of needs and topics: diabetes, chronic obstructive pulmonary disease (COPD), congestive heart failure (CHF), asthma, arthritis, cancer, Alzheimer's, Parkinson's, medication assistance, virtual visits with doctors, vital signs capture, personalized patient education, fall prevention, social support, transportation support, and support for activities of daily living. Below are some of the participants from our pilots and some of their experiences with personal health technologies that provide many kinds of e-care in their homes:

» **“Ben,”** is a 72-year old CHF patient, now facing the challenge of taking his 12 medications daily, without support from his wife who recently passed away. Wireless sensors in his home help Ben, his adult son, and a nurse practitioner manage his meds routine, with intelligent prompts that can appear on his watch, TV, phone, or small screens placed around the house but that don't bug him if he has already taken the meds, is asleep, or on the phone.^v

» **“Phillip,”** who is in his 10th year of dealing with diabetes, gets customized patient education sent to him based on his weekly vital signs, his answers to questions from his physician, and his exercise/nutrition logs that he keeps online with a social support group.^{vi}



» **“Gladys,”** is an 89-year old retired nurse now living in an assisted living facility, who was team leader for her hallway and tried to get each resident to take 10,000 steps a day. Wearable internet connected pedometers fed their data into a television monitor that showed their progress towards 1,200,000 collective steps for their team that week!

» **“Carl,”** is an 86-year old Parkinson’s patient who wears a watch that measures his tremor all the time and uses a laptop-sized prototype to test his speech and motor skills daily to help his physician and daughter monitor the progression of—and some day medications for—this disease that can vary greatly day by day.

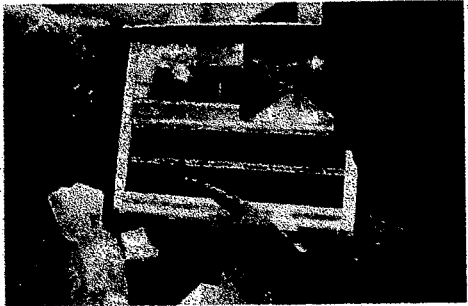


» **“Anne,”** is a nurse of 21 years, who is exhausted by all of the paperwork to track the safety and activities of daily living data for the elderly residents she cares for. A sensor network system helps track those activities—getting

dressed, toileting, exercise, preparing a meal—and reports back the progress to her and to the families of the residents so she can do more bedside care, and less paperwork.^{vii}

» **“Betty,”** is only 49 but has early stage Alzheimer’s and is using software that helps her practice the names and faces of people who visit her, as well as see a photo and the relationship of the person who is calling her on the phone. Her neurologists and family caregivers can review reports that show Betty being more or less socially engaged than usual, as well as how she is doing on a series of cognitive games that she plays daily on her computer.^{viii}

» **“Jennie,”** who has had some trouble walking after rehab from hip surgery, has a small wearable device and an area of carpet in her home that has sensors in it to monitor subtle changes occurring in her movement patterns around the house in order to alert her and her doctor if she may becoming more at risk for a fall.^{ix}



» “Phyllis,” is 71 years old and still drives a car in her rural village. She uses a GPS system and a ride sharing social network site to offer rides to other seniors in nearby villages who can no longer drive themselves, thus helping solve a transportation problem and to support more social connection for everyone.

» “Hal,” who lives on a farm more than 150 miles from the largest city and hospital, does virtual video visits with his geriatrician to check on his heart disease, weight, and pacemaker without having to make long trips as often.

Large Scale E-Care Programs Work

As our nation looks for ways to improve quality, access, and costs of healthcare, it is important to realize that these e-care technologies can help save lives and dollars. For example, the Department of Veterans Affairs (VA) studied this issue in their 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 \$1600 per patient per annum for the telehealth program compared to \$13,121 for primary care and \$77,745 for nursing home care. Not only were patients able to avoid readmissions and improve their health status faster through telehealth services, taxpayers saved money.*³

Likewise, the New England Healthcare Institute’s *2008 Research Update, Remote Physiological Monitoring*, found a 60 percent reduction in hospital readmissions using remote patient monitoring compared to standard care and a 50 percent reduction in hospital admissions using remote patient monitoring compared to disease management programs without remote monitoring. *In addition, this report estimates remote patient monitoring has the potential to prevent between 460,000 and 627,000 heart failure related hospital admissions each year.*⁴

Seniors “Get” HIT and Can Use It

I would be remiss in this summary of high level findings about our research with seniors if I did not address one of the biggest myths we see from family members, policy makers, and technology designers. Simply put, and contrary to many stereotypes, seniors can and will learn new technologies. In our experience, if the systems are designed well, if the value propositions are made clear to the seniors, and if proper training is done, seniors—even those with early to moderate cognitive decline—can and will learn new systems. Time and time again we are told by a family caregiver or doctor that a particular patient or senior can’t learn a new technology; time and time again the patients and seniors prove them wrong when the technology has clear benefits for them.

We have taught 90-year-olds with memory loss who have never used a PC before to use a trackball and laptop to enter records about their phone conversations. We have seen many technology-averse diabetes and heart disease patients easily use a telehealth appliance to take their blood pressure, answer an online questionnaire, or do a virtual video visit with a nurse. We have introduced cell phones that can be used for medication prompting, food journals, and multimedia cognitive behavioral therapy sessions to seniors and other patients, who have never used one before.. While it is true that the design challenges are often greater—and the usability testing longer—for systems where seniors have no prior experience with the technology, it can be done. And the payoff is enormous as they rediscover activities they can do again, feel empowered to tackle a health problem, or connect with a long lost friend from their past.

Spending Our Nation's HIT Dollars Strategically: Shift Left

The significant investments in HIT infrastructure and the incentives for clinician adoption in the recent ARRA stimulus legislation as well as the health reform bill are an important starting place for preparing our country for Global Aging. 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. We must move towards a world in which accurate, secure, real-world, and eventually real-time data can be used on a “micro” level (e.g., a physician reviewing lab data at the patient bedside) as well as a “macro” level (e.g., a group practice reviewing its quality data to improve the effectiveness and efficiency of its best practices).

The current policies and laws are designed to get the United States to the first phase of HIT—what I call the “Get Connected” phase. I often use the following four-phase framework with healthcare customers and collaborators I work with at Intel. It is admittedly over-simplistic, but it helps to show a progression of HIT adoption:

Phase I: Get Connected: All providers have—and regularly use—basic, secure EHR software to collect and share patient data across the medical enterprise, with basic computerized physician order entry (CPOE) as routine for all stakeholders.

Phase II: Get Decisive: All providers are using decision-support systems, with best practices implemented, and quality data metrics in place (on top of their EHR) to flag variability, breakdowns, or areas for improvement.

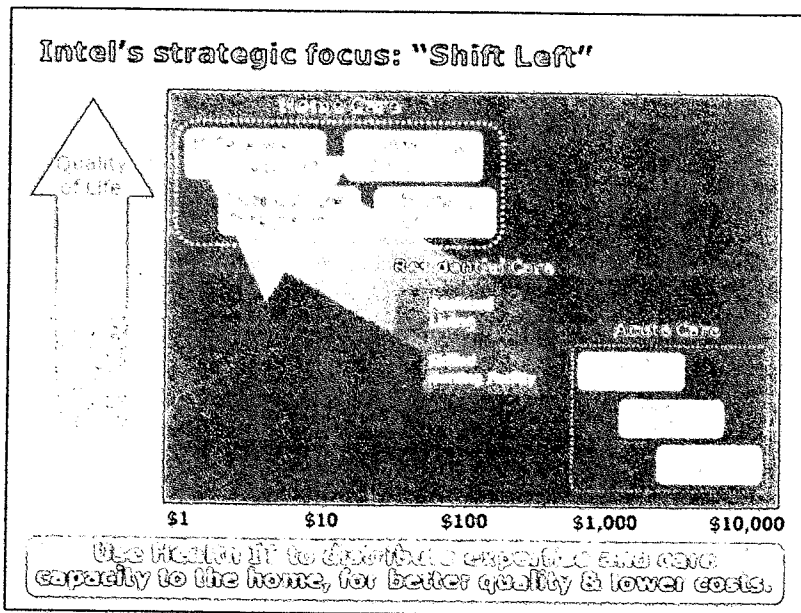
Phase III: Get Coordinated: All providers regularly use a wide array of care coordination tools (shared records, shared virtual whiteboards, multimodal messaging, care plan tracking, etc.) with one another and with the patient and family members, with each constituent playing his or her role.

Phase IV: Get Personal: We have a proactive, prevention-oriented system of care that personalizes care plans based on multiple diseases, incoming data, patient preferences, available resources, and, increasingly, genetic information,

that shifts care and responsibility to the patient and to the home, when appropriate.

To produce a personal health system that can meet the demands of the Age Wave, we need to broaden the focus of "healthcare" beyond acute care to all its domains: primary care, prenatal care, chronic care, home care, long term care, etc. using HIT to triage resources and shift care to the home, community, and informal care networks as much as possible. And we need to look for ways to drive more disruptive transformation towards Phase 3 and Phase 4 where HIT is not only integrated into the workflow and culture of care, but is being used to drive a more proactive, prevention oriented system that leverages e-care appropriately. Finally, we need reform policies and HIT investments that focus more attention on the specific needs of seniors, who are most often dealing with multiple chronic conditions, numerous medications and therapies, and have the most expensive utilization.

At Intel, a useful phrase that captures our own strategic intent—and rallying cry—for HIT innovation is called "Shift Left." The diagram below shows the basic concept. Our goal is to invest in innovations that ultimately shift care out of expensive acute care settings and into the community (primary care clinics) or even the home, where quality of life is higher and daily costs are lower.



If we can “shift left” much of the chronic and non-emergency care that patients need from the hospital to the home through e-care technologies, then we can reserve those most expensive care delivery systems for the most extreme circumstances. As Carol Levine and her co-authors point out in a recent *Health Affairs* article, that shift is already happening: “Almost unnoticed, health care providers have shifted to family caregivers more demanding and complex kinds of care that last longer periods—sometimes for decades.”ⁱⁱⁱ We must now *consciously* and *conscientiously* move care, responsibility, training, infrastructure, and resources to the home and community, thus offloading the traditional healthcare institutions that will be besieged by newly insured and/or newly retired citizens. It is not just about technology, but also about “skill shifting” some of the aspects of care done by medical professionals today to patients and family members, who will need training, incentives, and support to take on these new roles and responsibilities.

Whether it is something akin to the phase model or “Shift Left” strategy I described above or something else entirely, we need some clarity about what the “end game” for healthcare reform looks like in order to guide the meaningful and strategic use of HIT over time. The President and Congress have repeatedly highlighted key elements of that end state: universal coverage of people and conditions; a health care system as opposed to a sickness care system; a prevention oriented system; one that focuses on quality of care delivery instead of quantity; a system in which data-driven care coordination and evidence-based best practices are the norm. But these powerful ideas have yet to cohere into a unifying and understandable strategy by which to guide our investments and measure our progress. And they have yet to include adequate attention to and incentives for making e-care a reality in the United States.

Removing the Barriers to HIT and e-Care Adoption

Across twenty years of research and pilots of e-care technologies with seniors, I have almost always seen doctors and nurses approach these new technologies with a healthy skepticism, if not outright distrust, at first. That is a good thing. They’ve never seen these solutions before and don’t have training or instincts about how to use these technologies safely and effectively with their patients. But once they have gotten used to these systems—and integrated them into their workflow over time—the physicians and nurses almost always fight to keep these technologies for their patients.

Whether it was a telehealth solution to virtually coach congestive heart failure patients on how to recover from surgery at home...or a Parkinson’s prototype to help personalize treatment for the senior based on his or her actual symptoms from the previous week...or a home sensor network to help prompt an elder to take nine medications safely every day...the providers have found that the real world data and connections to the patients at home offer vital and new ways to deliver care. Many have even said to me that they feel it is almost unethical to stop doing e-care once they have started because it gives them better ways to care for their patients. And then they have that inevitable painful moment where they remember that almost every aspect of their business model of care today prevents them from using these technologies. Thus, the grant-funded pilot ends, the

technologies are taken out of the patients' homes, and everyone goes back to the traditional ways of doing care that have been with us for more than 100 years.

I am becoming more hopeful. The recently passed health reform legislation creates a number of opportunities to begin to incorporate the use of wireless, remote, and other health information technologies in coordinated care pilots and alternatives to institutional care. For example, telehealth, remote patient monitoring, or other forms of technologies are included as options for Accountable Care Organizations and the Independence at Home Project, the CMS Innovation Center, and community health teams to support the Medical home. While there is no focused "shift left" strategy or e-care mandate in the health reform bill, we estimate that approximately 21 provisions touch upon the use of patient and home-based HIT in a variety of forms. This is a good start that we can build upon.

I want to echo and agree with the FCC's National Broadband Plan conclusions that reimbursement remains one of the biggest barriers to innovative e-care implementation. The FCC correctly identified the lack of incentives for the use of home-based HIT for Medicare and Medicaid patients. All the promising research done on aging-in-place and telehealth solutions will never come to fruition unless we find ways to ensure that the broadband infrastructure is there to support these activities, and Medicare and other health programs acknowledge the value of the services these e-care technologies provide. That acknowledgement must be in the form of reimbursement for the service or an incentive to the provider to provide e-care. Without reimbursement, providers have no incentive to use these technologies and companies will have no incentive to further develop them.

Medicare often leads the way in helping shape delivery changes. Medicare can and should play an important role in creating policy—including reimbursement policy—to get our country to what I earlier called Stage IV of Health IT—"Getting Personal." As we saw with electronic health records, there were many policy issues that had to be considered before legislation could be passed. The Y2K+20 clock is ticking, and we cannot wait another 20 years to use the e-care solutions we have available today on top of that EHR infrastructure. I urge CMS to develop additional expertise in this area, to appoint an executive-level leader at CMS to consult with manufacturers and researchers about integrating e-care technology into demonstration projects, payment policy, and quality issues, and to be able to realize the full benefit of the investment Congress made through AARA in electronic health records.

Recommendations for an e-Care Infrastructure

Our biggest barriers to deploying these kinds of personal health technologies to meet the needs of our aging population may well be a lack of reimbursement policy, training, R&D infrastructure, and overall policy as much as the technology itself.

I. Financial Infrastructure: Our goals should be to incentivize providers, patients and families to be more engaged and proactive about their own health and wellness challenges and to ensure that new payment models for clinicians have the infrastructure and incentives to meaningfully include patients and their families in order to help offload the medical system, especially for long term and chronic care.

1) **Provide CMS with Expertise:** Create an informal advisory committee of companies and researchers working on aging-in-place and telehealth solutions to assist CMS in understanding and thinking about how to appropriately pay clinicians for services that leverage e-care technologies. Such a committee could assist CMS with learning what has been developed and what research is being conducted worldwide.

2) **Cash and Counseling (C&C):** Extend C&C programs, which are currently in effect in more than a dozen states and would benefit from extension to all 50. Identify tax credits, stipends and other types of payments to family caregivers, giving more flexibility to elder and chronic care outside of institutional settings.

3) **Care Coordination/Payment Bundling Pilots:** ARRA and the health reform bill fund new payment reform pilots for coordinated care such as Accountable Care Organizations. Patients and families should be included in the workflows, infrastructure, and incentives for those pilots...and successful pilots should have the ability to scale up to nationwide benefit.

5) **Home and Community Based Services Pilots:** Incorporate HIT strategies and designs into plans that create financial incentives for states to shift Medicaid beneficiaries out of nursing homes into home and community based services (HCBS). E-care technologies offer great promise for so-called "money follows the person" programs.

6) **"Care Corps":** Experiment with "Americorps" type training and volunteer organizations that incentivize neighbors and families with training to help care for frail or chronic members of their community. For example, a CNA might receive scholarships for college in exchange for caregiver support or training in the community.

II. Training Infrastructure: Our goals should be to prepare a "careforce" for the 21st century that trains patients and family/friend caregivers on how to use HIT as part of effective care coordination teams, while also developing curriculums and credentialing for new kinds of care workers—both paid and volunteer—who augment and complement scarce personnel like nurses and physicians.

1) **Workforce:** Commission a study to identify new kinds of care workers needed to support HIT-enabled home and community based e-care, some clinically trained, some not (e.g., care coaches, care coordinators, patient advocates, etc.).

2) **Workflow**: Develop workflow models (staffing models, shift design, care management) for HIT-enabled care coordination across patients, families, and providers that help providers transition from clinic-only to home, clinical, and virtual care.

3) **Health IT Workforce**: Accelerate job training programs and growth of a workforce with expertise in health IT design, engineering, usability, and informatics, with special programs focused on e-care workforce.

4) **Family Caregiver Training**: Identify the best family caregiving training programs being conducted in many states and scale those into a national curriculum of best practices to be taught at community health centers, community colleges, churches, and other forums in the community.

5) **Credentialing**: Build mechanisms for certification and credentialing of these new kinds of care workers, both paid and volunteer, such as the “Grand Aid” program being developed by Tim Garson at the University of Virginia to train and credential grandparent age citizens as chronic care managers in their communities.

6) **Licensure**: For new kinds of care workers and our telehealth workforce, develop national licensure rules that allow them to practice e-care across states and virtually. It is important that care and care teams “follow the patient” with some continuity, even if he or she crosses borders. And e-care support centers will not achieve economies of scale if they cannot deliver assistance across state borders.

III. R&D Infrastructure: Our goals should be to accelerate the invention, evaluation, and deployment of new technologies and services that help move care to the home and community and help promote prevention, early detection, behavior change, caregiver support, and independent living.

1) **National Research Priority**: Put in place a mechanism that can work across the National Institutes to prioritize cross-disciplinary research in personal health technologies and home-and-community-based care delivery and engage patients and families in their own care. Without an agency owning this e-care agenda, it will likely be lost in the focus on acute care settings and EHR adoption in hospitals.

2) **10,000 Households Study**: Commission a national cohort study of 10,000 elder households—think of this as the “Framingham Heart Study for Personal Health Technologies”—who can test out promising inventions and interventions on a larger scale and help to accelerate the commercialization of new technologies for engaging patients and families in their care.

3) User Centered Design: Embed social science and pilot research functions in RECs (regional education centers) and the CMS Innovation Center as well as other government funded Centers of Excellence to ensure there is a foundation for understanding the real needs of patients, families, and providers as we invent and deploy HIT solutions for e-care.

4) Retirees Registry: There is a large untapped reservoir of clinical and technical expertise in homes, assisted living facilities, and retirement homes across the country where retired nurses, physicians, and engineers reside. Create a national registry and campaign to sign them up as volunteers to co-create and test out independent living solutions of the future.

5) Incentivize Personal Health Technology Startups: Look for ways to accelerate and encourage the development of a new industry of e-care technologies, perhaps by catalyzing the Venture Capital community in this domain. Also, revisit the medical device tax in the healthcare reform bill to ensure it does not curtail or limit emerging technologies and small startups from bringing new solutions to this market.

IV. Technology Infrastructure: Our goal should be to make sure that government and private investments in fundamental technologies, such as health IT and broadband, prepare us for a distributed, community-and-home-based health delivery system that is ready for the 21st century and the Age Wave, especially as retiring Boomers require (and demand) a more personalized, home-based healthcare experience.

1) Meaningful Use: The next phases of Meaningful Use requirements should prioritize use cases and care delivery models that shift care into the home and community. It is important that HIT, such as interoperable RPM devices, personal health technologies, and independent living technologies, can be certified as EHR modules and can meet the requirements of MU certification criterion.

2) Standards: As diagnostic, self-care, and care delivery technologies extend into the home and community, it is important that they be interoperable and "plug and play" to enable patients and families to install them. The Continua standards should be adopted and promoted, for example, to drive such interoperability.

3) Broadband: Ubiquitous, affordable broadband is essential for extending healthcare to the home across the United States, particularly for rural and underserved communities. As the National Broadband Plan is enacted, we need to make sure that the infrastructure meets the requirements for a community to ensure adequate connectivity among all of the constituents in a coordinated care model: hospitals, clinics, doctors offices, labs, pharmacies, and homes. The specifications should press for a reliable, higher bandwidth connection that supports e-care delivery, and we should identify ways to expedite flexible connection service for patients with health related needs.

4) Personal Health Records: While we focus on the rollout of EHRs to clinicians, we should ensure that they connect via PHRs to provide data and/or data summaries to all patients and their designees. Patients should have the right to specify that they want electronically transmitted information sent to their PHR at costs that should be presumptively zero and never more than the cost of sending the same information to other EPs, hospitals and insurers.

V. Policy Infrastructure: Our goal should be to remove other barriers to—and create new policies for—the advancement of HIT and e-care technology that engages patients and families in their own care and helps us achieve quality care for more people with fewer resources going forward.

1) Evaluate American Competitiveness for New Health Industries: Authorize the Commerce Department or some other appropriate government agency to study the emerging industry of personal health technologies and to evaluate America's strengths, weaknesses, barriers, and competitiveness in catalyzing new products, services, and jobs in this e-care marketplace.

2) Y2K+20 Commission To Drive Personal Health: We need to ensure that e-care for independent living and chronic disease management is part of our national healthcare strategy, not an afterthought or unfunded mandate. We need a Y2K-equivalent Commission to promote cross-government and private initiatives that ready our nation for a 21st century healthcare system that can personalize care and distribute delivery across time, place, and personnel to meet the needs of the Age Wave.

Conclusion

What we're really talking about here today is behavior change—culture change—for one of our most personal issues—healthcare—on a very large and long scale. We need to remember that there is a place for technology, but we also need to keep technology in its place—thus, as just one part of a comprehensive national strategy for healthcare. We shouldn't glorify technology; nor should we ignore it. We simply need to ensure that Congress and the agencies overseeing programs for seniors understand the value of e-care technologies and find ways to allow Medicare and Medicaid to incorporate these innovations to enhance health care services and access for everyone.

In sum: Prepare for Y2K+20! We can go home again (and must). Fifty percent of care should be provided in the home by 2020! And we all need to be part of the solution—enlisted as patients and caregivers in the 21st century careforce and regularly using e-care technologies that complement the clinic and hospital visits we have become so accustomed to over the past century. Thank you for the opportunity to share these ideas and recommendations today.

¹ See the AARP and National Alliance for Caregiving 2004 report on "Caregiving in the U.S." at <http://www.caregiving.org/data/04finalreport.pdf>

¹⁰ See "An Aging World: 2001," November 2001, by Kevin Kinsella and Victoria A. Velkoff. At <http://www.census.gov/prod/2001pubs/p95-01-L.pdf>.

¹¹ See official Congressional testimony for the 2004 hearing at <http://www.access.gpo.gov/congress/senate/pdf/108hrp/94289.pdf>. Or a more readable version of my comments at http://www.agingtech.org/documents/2004_0427DishmanTestimony.pdf

¹² For a brief description of one of the ethnographic studies we have done on aging, see <http://www.intel.com/healthcare/hri/pdf/gacexperience.pdf>. Also, download a free white paper from the recent Intel Technology Journal with more about the global aging work at <http://www.intel.com/technology/ij/2009/v13i3/ITJ9.3.1-Global-Aging.htm>.

¹³ See more about our CAMP (context aware medication prompting) research [here](#). Also see, "A study of medication-taking and unobtrusive, intelligent reminding," *Journal of Telemedicine and e-Health* 15 (8), 770-776, October 2009. Tamara L. Hayes, Kofi Cobbinah, Terry Dishongh, Jeffrey A. Kaye, Janna Kimel, Michael Labhard, Todd Leen, Jay Lundell, Umüt Ozertem, Misha Pavel, Matthai Philipose, Kevin Rhodes, Sengul Vurgun.

¹⁴ See <http://www.intel.com/healthcare/ps/healthguide/>.

¹⁵ See Sheri Roder, Gwen Ambler, Matthai Philipose, Susan Hedrick, *Technology and Long-term Care (TLC): A pilot evaluation of remote monitoring of elders*. In *Gerontechnology* 9(1), Winter 2010.

¹⁶ See "Social Networks as Health Feedback Displays," *IEEE Internet Computing*, Volume 9, Issue 5 (September 2005), Pages: 29 – 37. Or click [here](#).

¹⁷ See http://www.frilcentre.org/falls_prevention/falls_prevention_474.html.

¹⁸ See Telemedicine and e-health December 2008 Volume 14, #10 "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" by Adam Darkins, M.D., Patricia Ryan, R.N., M.S., Rita Kobb, M.N., A.P.R.N., Linda Foster, M.S.N., R.N., Ellen Edmonson, R.N., M.P.H., Bonnie Wakefield, Ph.D., R.N., and Anne E. Lancaster, B.Sc. Department of Veterans Affairs, Office of Care Coordination Services, Washington, D.C.

¹⁹ See , Feb 7, 2010

http://www.nchi.net/publications/36/remote_physiological_monitoring_research_update

²⁰ See "Bridging Troubled Waters: Family Caregivers, Transitions, And Long-Term Care." January 2010, by Carol Levine, Deborah Halper, Ariella Peist, and David A. Gould, *Health Affairs*, page 117.

Senator CORKER. Great testimony.
Mr. Felder.

**STATEMENT OF ROBIN FELDER, PROFESSOR OF PATHOLOGY,
ASSOCIATE DIRECTOR, CLINICAL CHEMISTRY, THE UNIVER-
SITY OF VIRGINIA SCHOOL OF MEDICINE, CHARLOTTES-
VILLE, VA**

Dr. FELDER. Senator Corker and your colleagues in absentia, I thank you for the invitation for being invited to present here today. Today's testimony and the accompanying written statement will address how an expanded broadband infrastructure can result in dramatic cost savings, yet higher quality health and wellness in elders, and hopefully add to the well-published VA-system studies we heard about today.

Broadband-based telemedicine has the potential to reduce the cost of medicine by well over 50 percent, stimulate economic growth in the medical technology sector, and raise the quality of life for seniors and all Americans to unprecedented levels. Since our elders will generate a high percentage of the estimated 4.2 trillion total annual economic burden of chronic disease by 2023, how is the United States going to deal with this enormous challenge?

Advances in telemedicine, sensors communication, information technologies will enable distance-based healthcare that rivals hospital-based care; essentially, the hospital, without walls.

In-home monitoring has the added benefits of measuring individualized health, as well as psychosocial status, and continuously reporting it to the individual, primary care providers, and caregivers alike. I don't think we've heard a lot about psychosocial support today. The benefits will include quicker and understandable wellness information and targeted preventative interventions. In-home monitoring may be the key solution that addresses efficient and effective means of care delivery to elders, while allowing them to age in their place of choice, particularly in rural health, which we've heard about earlier this morning.

Health-monitoring home environments have been accomplished by wearable sensors and passive sensors embedded in the home environment. I'd like to emphasize that compliance is one of the major challenges with monitoring the elderly today such as getting them to strap on that wristwatch, place that device in their pocket.

But, there is a new wave of passive sensing that, simply by existing in your home, you will be monitored for health conditions. For example, sensors embedded in a mattress pad can provide high-quality sleep assessments that rival sleep-lab assessments in hospitals. Continuous monitoring of vibrations in the floor can detect falls and classify them according to the best choice of first responders, either a 911, if it's a concussive fall, or a visit by a care provider that could help deal with falling issues such as stumbling followed by continuing ambulation. Tiny sensors worn in body orifices engineered, so these can be placed and remain for 6 months, can report glucose continuously to cell phones or to the home phone. In other words the elder does not have to be compliant, since there are no buttons to push and no instruction manuals to read.

Deploying sensor-based telemedicine does not have to be costly. We conducted, in our group, a case-controlled study comparing

monitored versus nonmonitored elders, passively, in a senior living facility in the Midwest over a 3-month period. Our studies demonstrated a 36-percent reduction in billable medical procedures, a 78-percent reduction in hospital days, and a 68-percent reduction in the cost of care. In addition to the reduced cost of care, the efficiency of the caregivers actually went up by 50 percent. So, not only did costs come down, but efficiencies went up for the caregivers. Thus, monitoring technologies can significantly reduced billable interventions, hospital days, and cost of care to payers, and has a positive impact on professional caregivers' efficiency.

Medication compliance is also a significant challenge in the eldercare environment. In the near future, small pill-dispensing kiosks will dispense a wide range of medications at home that will facilitate finding the optimal doses that minimize side effects. These broadband-connected medication dispensers will allow the electronic medical record to be automatically updated with regard to medication compliance and efficacy.

Nutritional support is often an overlooked factor in managing health and well-being in elders. Lack of proper nutrition can be a significant factor in hospital readmissions. Broadband-based in-home monitoring can determine if meals were delivered, if the elder consumed the meal, and if there are steady improvements in health as a result. Thus, automated nutrition support is one of the easiest challenges to solve and one of the most costly to ignore in the United States.

In conclusion, broadband access with passive technologies will enable even those with little interest in their health to be encouraged to adopt healthy lifestyles. Delaying or arresting chronic disease, providing nutritional support, and assuring psychosocial well-being are some of the most proven benefits of home-based passive monitoring technologies.

Finally, since home-based wellness results in costs that are 50 percent less than traditional care, it provides a basis for using broadband to revolutionize this Nation's healthcare system.

Again, thank you for the invitation to address the committee.

[The prepared statement of Dr. Felder follows:]

Testimony of

Robin A. Felder, Ph.D.

Professor of Pathology, Associate Director Clinical Chemistry

The University of Virginia School of Medicine

Before the

Senate Special Committee on Aging

April 22nd, 2010

Mr. Chairman, Sen. Corker, Distinguished Members of the Committee:

My name is Robin Felder. For the past 26 years I have been on the faculty of the University of Virginia, School of Medicine. I currently hold the academic rank of full professor and serve as an Associate Director of Clinical Chemistry. Previously, I was the founding director of the Medical Automation Research Center <http://marc.med.virginia.edu>, an academic "think tank" that focused on the development of advanced technologies that improve the quality while reducing the high cost of health care. Our work on health care processes and technologies resulted in the publication of over 100 papers, chapters, reviews, and 3 textbooks and numerous awards. In addition, 8 companies were founded based on the 13 patents resulting from our work. In addition, I currently serve as founding Chair of Medical Automation <http://medicalautomation.org>, a non-profit educational organization focused on bringing process improvement and cost reductions to medical care. The information that I will present in testimony and in print will be my own opinion and neither that of The University of Virginia nor Medical Automation.

As part of our research, we focused on technologies that could take advantage of the broad band infrastructure in order to allow elders to age in place of choice while lowering the cost of care. Our work in aging technologies attracted the interest of two of the nation's largest faith based non-profit eldercare providers who funded our research. Following successful clinical trials, these two organizations formed a consortium and funded the launch of a for profit entity, WellAWARE systems <http://wellawaresystems.com>, that has attracted venture capital funding in order to become one of the leading home-based eldercare health technology providers. Today's testimony, and the accompanying written statement will address how an expanded broad band infrastructure can result in dramatic cost savings, yet higher quality of health and wellness in elders. This information is based on my experience as both an academic researcher as well as my experience in successfully marketing medical technologies.

Broadband based telemedicine has the potential to reduce the cost of medicine by over 50% (1), stimulate economic growth in the medical technology sector, and raise the quality of life for senior Americans to unprecedented levels (2). Estimates show that 10,000 Americans will retire every day starting in May of 2011 and continue at this pace producing over 43 million retired seniors by 2023. Since chronic diseases are common in elders, they will account for a high percentage of the estimated \$4.2 trillion total annual economic burden of chronic disease by 2023 (3).

How are we, as a nation, going to deal with the enormous challenge of managing the health of our elders? Already significant progress is being made in understanding the underlying etiology of chronic disease, however, detection and treatment does not always have to rely on traditional clinic or hospital based health care delivery. Patient can do an effective a job of self-managing their chronic disease. This self-help process can delay or even prevent disability and reduce costs associated with chronic illness (4). However, additional home-based healthcare paradigms can add costly burdens to our already over burdened health care system. We need more affordable approaches. Advances in telemedicine, sensors, communication, and information technologies will enable distance based health care that rivals hospital based care. In-home monitoring has the added benefit of measuring individualized health as well as psychosocial status and reporting it to the individual, primary care providers, and caregivers alike. The benefit will be quicker and understandable wellness information and targeted preventive interventions (1,4). In-home monitoring may be the key solution that addresses

efficient and effective means of care delivery to elders while allowing them to age in their place of choice.

Health monitoring in home environments has been accomplished by wearable ambulatory monitors that record physiological signals (5,6), or sensors embedded in the home environment and furnishings to unobtrusively collect behavioral and physiological data, or a combination of the two. For example, sensors embedded in a mattress pad can provide high quality sleep assessments that rival sleep lab monitoring in hospitals (7). Continuous monitoring of vibrations in the floor can detect falls and classify them according to the best choice of first responders (either a 911 call or a visit from a caregiver)(8).

The issues of privacy and acceptance of unobtrusive wellness and psychosocial status are generally well accepted by both the participants and their primary care providers (9, 10). Furthermore, data gathered unobtrusively demonstrates clinical utility (11-14). Passive in-home monitoring is beneficial since it overcomes the challenges associated with health exaggeration and compliance in patient reporting. Furthermore, continuous monitoring is a richer data set as compared to data obtained in a single patient encounter with the health system. For example, chronic ambulatory blood pressure monitoring at home provides more medically relevant information to physicians than blood pressure cuffs used in a doctor's office under some circumstances (15).

What does in home monitoring cost, and what are the potential economic benefits? We conducted a case-controlled study comparing monitored vs non-monitored elders in a senior living facility in the Midwest over a 3 month period. Our results demonstrated a 36% reduction in billable medical procedures, a 78% reduction in hospital days, and a 68% reduction in the cost of care. Despite the reduced cost of care, the efficiency of the caregivers increased by over 50%. Thus, monitoring technologies can significantly reduced billable interventions, hospital days and cost-of-care to payers, and has a positive impact on professional caregivers' efficiency.

Medication compliance is also a significant challenge in the eldercare environment. Polled U.S. individuals 65 years old and older who use medications (N>1,000) responded that 51% take at least five different prescription drugs regularly, and one in four take between 10 and 19 pills each day. 57% of those polled admit that they forget to take their medications (16). New devices have been developed that can automatically dispense pre-loaded medications on a timed schedule into a receptacle easily accessed by elders. The devices can either sound an alarm (or flash a strobe light) after dispensing the medications until they are consumed (17). Emerging technologies allow pills to be electronically outfitted with transmitters to communicate with the user's wristwatch that shows that the pill has been consumed but also the effect of the pill on the users pulse and respiration rate and stomach pH (18). Broadband connectivity of these devices would allow the electronic medical record to be updated with regard to medication compliance and efficacy. Entire formularies targeted to selected diseases could be dispensed at home in order to facilitate the often laborious task of finding effective medications. For example, pill dispensing kiosks will be miniaturized for dispensing blood pressure medication that will facilitate finding optimal doses that minimize side effects. At home pill dispensing can have significant economic benefit. For example, the Global antihypertensive drug sales were \$39 billion in 2008 with many antihypertensive drugs currently generating more than \$1 billion in annual revenue. Despite these large markets, the American Heart Association reports that over 18 million Americans who are taking medication still do not have their high blood pressure under control (19).

Nutritional support is often an overlooked factor in managing health and wellbeing in elders. Meals on Wheels, a non-profit largely volunteer organization serves over 3 million elders a day, yet 11% of elders are a risk for malnutrition. Even more startling is that over 50% of elders sent home following hospital based medical intervention that requires nutritional support did not get that support. Lack of proper nutrition can be a significant factor in hospital readmissions. Broad band based in home monitoring can determine if meals were delivered, if the elder is consuming the meal, and if there are steady improvements in health as a result. Thus, automated nutrition support is one of the easiest challenges to solve and one of the most costly to ignore.

In conclusion, broad band access with passive technologies will enable even those with little interest in their health to be encouraged to adopt healthy lifestyles. Delaying or arresting chronic disease, providing nutritional support and assuring psychosocial well being are some of the proven benefits of home based monitoring technologies. Finally, since home based wellness results in cost benefits that exceed 50% over that of traditional care, it provides a basis for using broad band to revolutionize the nation's health care system.

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Senator CORKER. Well, Chairman—Senator Wyden, we have our last witness. I want you to know he is from the great State of Tennessee, and I've already introduced him, so I just wanted you to know I was handing back off to you.

Senator Wyden [presiding]. I thank my colleague, and thank him very much for ably stepping in.

I apologize to all the guests. In the Budget Committee, you're technically sort of there, and you can't be liberated until it ends. [Laughter.]

So, I apologize to all our guests.

I gather that we have a very thoughtful leader in the field from Tennessee, Mr. Kuebler. Please proceed.

STATEMENT OF RICHARD KUEBLER, TELEHEALTH DEPARTMENT HEAD, UNIVERSITY OF TENNESSEE HEALTH SCIENCE CENTER, MEMPHIS, TN

Mr. KUEBLER. Good afternoon, Ranking Member Corker and Senator Wyden. Thank you for having me here today. I'm grateful for the opportunity to testify regarding aging in place and the associated healthcare technology which has such a significant impact on the quality and dignity with which our citizens receive healthcare.

My name is Richard Kuebler, and I am responsible for the telehealth program at the University of Tennessee Health Science Center in Memphis. Our program is nearly 12 years old. It's one of the oldest programs in the country. I, personally, have worked within the telehealth environment for the last 10 years.

We see telehealth, telemedicine or e-care work across a myriad of specialties. We use telehealth as a clinical delivery mechanism over distance. Telehealth can be as simple as remote glucometer monitoring or as complex as realtime diabetic retinopathy diagnosis. However, the results are the same.

Telehealth as a delivery mechanism for healthcare works. We see a diverse scope of patients. Since Tennessee borders more States than any other State, our providers are able to see patients from any of the eight States bordering Tennessee. Patients see no discernible difference between the levels of care. One provider was actually stunned when, at the conclusion of a consult, the patient stood up to shake his hand, despite being 200 miles away.

We've seen telehealth save lives, increase the quality of life, and treat chronic diseases across our State and our region. Telehealth specifically delivered remotely into the home has had a significant impact on health outcomes and cost savings. We, at UT, have the research outcomes that show home-based telehealth used on an at-risk population for congestive heart failure decreased hospital admissions by 80 percent. Hospital readmission rates were reduced by 85 percent, and, as a result, the cost per patient dropped from \$10,000 to \$2,500. Nationally, there are 5 million hospital stays per year for congestive heart failure, costing approximately \$8 billion. The national implications of utilizing telehealth in this single specialty could reduce healthcare costs by \$3.8 billion.

At the University of Tennessee Health Science Center in Memphis, we've developed the only realtime diabetic retinopathy technology program in the world. Diabetes is an epidemic that affects 21 million of our citizens and 20 percent of Tennessee's population.

An additional 7 and a half million people across the country have prediabetes. Diabetic retinopathy is the leading cause of blindness among adults in the industrialized world, and currently in the United States, 400,000 patients are screened for diabetic retinopathy each month.

Traditionally, the screening is done as a store-and-forward, and the results are returned, taking as long as several days to a week. The patient then has to be rescheduled, and then the diagnosis delivered. Utilizing digital imaging and highly advanced computer algorithms, developed with Oak Ridge National Labs, we've been able to deliver those results within 90 seconds, drastically saving costs and increasing the efficiency of patient care.

Now, there are associated costs with telehealth, not the least of which is connectivity. The FCC, as they mentioned earlier, has several programs which subsidize connectivity into rural and underserved areas, offsetting the cost of rural-based broadband by up to 85 percent. While existing home-monitoring technologies may not be bandwidth-intensive, the access of broadband at home can establish a platform for ancillary medical services, such as clinical videoconferencing, education, and medication management technologies. The expansion of wireless 4G technology or traditional land-based fiber optics will have significant impact on the level of care delivered to the home or the "last mile."

Successful business models for telehealth is direct contracting between the service providers, such as UT, the Health Science Center, and Managed Care Organizations. In the case of maternal fetal medicine and pediatric cardiology, providing blanket service for a regional population can provide cost capitation for the MCO while also covering the cost of delivering telehealth services into outlying or even metropolitan areas.

However, the most significant barrier to adoption is reimbursement. In the previous real-world examples I gave you telehealth applications with both chronic heart failure and diabetic retinopathy, there is no reimbursement for providing these services.

When left to altruism alone, there is little hope of a sustainable business model for telehealth or e-care. In most cases where telemedicine practices are reimbursed, it's done on a lower scale than a traditional brick-and-mortar patient encounter.

So, if a provider is reimbursed two to three times as much for a traditional clinical encounter versus a telehealth encounter, which type of healthcare is incentivized? Telehealth is actually disincentivized for both providers and facilities in the current fee-for-service model. While reimbursement varies from State to State, the successes of telehealth implementation, from a billing standpoint, have been the inclusion of telehealth as a traditional method of care. Whether delivery of healthcare into the home or the extension of specialists into rural and underserved areas, there must be an equitable billing mechanism for telehealth to be sustainable.

Currently, telehealth is reimbursed as an exception or a "less than" method of care delivery. States such as California and Missouri, they've incentivized the practice of telehealth by State Medicaid provisions, which reimburse equally for telehealth services which meet certain technical criteria.

Telehealth should be viewed as an accepted level of care, versus an exception to the rule, from a reimbursement standpoint, whether delivering care into the home or treating a patient in a rural or metropolitan clinic.

At UTHSC, in Memphis, we've seen the opportunity and radical improvement to healthcare that telehealth can afford. The implications can go far beyond the quality of life for our aging population, preventing hospital stays and nursing-home enrollments. The significant cost of healthcare for our aging population is undeniable, and we have demonstrated that the cost savings exist. Ultimately, a model must be created to ensure that telehealth-care providers are equitably reimbursed; otherwise, there's no incentive to change traditional delivery of care.

Telehealth is not a panacea. Like any other form of healthcare practice, there is potential for abuse. However, the potential of healthcare possibilities is almost limitless in the ability to provide quality medical care over distance.

Ranking Member Corker, Senator Wyden, thank you for the opportunity to speak with you about the incredible opportunity that faces us regarding advancing the level of healthcare in our State and our country. I am happy to answer any followup questions you may have.

[The prepared statement of Mr. Kuebler follows:]

Good afternoon Chairman Kohl, ranking member Corker and Senator Wyden. Thank you for having me here today. I am grateful for the opportunity to testify regarding Aging in Place and the associated healthcare technology which has such a significant impact on the quality and dignity with which our citizens receive healthcare.

My name is Richard Kuebler and I am responsible for the Telehealth program at the University of Tennessee Health Science Center (UTHSC) in Memphis. Our program is nearly 12 years old, and is one of the oldest programs in the country. I have worked within the Telehealth environment for 10 years. We have seen Telehealth (telemedicine, eCare) work across a myriad of specialties, and we use Telehealth as a clinical delivery mechanism over distance. Telehealth can be as simple as remote glucometer monitoring or as complex as real time diabetic retinopathy diagnosis. However, the results are the same. Telehealth as a delivery mechanism for healthcare works. We see a diverse scope of patients and since Tennessee borders more states than any other State in the country, our providers are able to see patients from any of our 8 bordering States. Patients see no discernible difference between the levels of care. One provider was stunned when, at the conclusion of a consult, the patient stood up to shake his hand despite being 200 miles away. We have seen Telehealth save lives, increase the quality of life and treat chronic diseases across our State and our region.

Specifically, healthcare delivered remotely into the home has had a significant impact on health outcomes and cost savings. We at the University of Tennessee Health Science Center in Memphis have the research outcomes that show home-based Telehealth used on an "at risk" population for congestive heart failure decreased hospital admissions by 80%. Hospital readmission rates were reduced by 85% and as a result the cost per patient dropped from \$10,000 to \$2,500. Nationally, there are 5 million hospital days per year for congestive heart failure costing approximately \$8 billion (based on \$1600/year average). The national implications of utilizing Telehealth in this single specialty could reduce health care costs by \$3.8 billion.

At University of Tennessee Health Science Center in Memphis, we have developed the only real-time diabetic retinopathy technology program in the world. Diabetes is an epidemic that affects 21 million of our citizens and 20% of Tennessee's population. An additional 7.5 million people across the country have pre-diabetes. Diabetic retinopathy is the leading cause of blindness among adults in the industrialized world, and currently in the United States 400,000 patients are screened for diabetic retinopathy every month. Traditionally, the screening is done as a store-and-forward method taking as long as several days to a week for results to be returned. The patient then has to be rescheduled and the diagnosis delivered. Utilizing digital imaging and a highly advanced computer algorithm, we are able to deliver the result within 90 seconds, saving costs and drastically increasing the efficiency of patient care.

There are associated costs with Telehealth, not the least of which is connectivity. The FCC has several programs which subsidize connectivity into rural and underserved areas which offsets the cost by up to 85%. While existing home monitoring technologies may not be bandwidth-intensive, the access of broadband at home can establish a platform for ancillary medical services such as clinical videoconferencing, education and medication management technologies. The expansion of wireless 4G technology or traditional land-based fiber optics would have significant impact on the level of care delivered to the home or "last mile."

A successful business model for Telehealth is direct contracting between the service providers such as University of Tennessee Health Science Center and Managed Care Organizations (MCO's). In the case of maternal fetal medicine and pediatric cardiology, providing blanket service for a regional population can provide cost capitation for the MCO while also covering the cost of delivering Telehealth services into outlying or metropolitan areas.

The most significant barrier to adoption is reimbursement. In the previous real world Telehealth applications of both chronic heart failure and diabetic retinopathy there is no reimbursement for providing these services. When left to altruism alone, there is little hope of a sustainable business model for Telehealth. In most cases where Telehealth practices are reimbursed, it is done on a lower scale than a traditional brick and mortar patient encounter. If a provider is reimbursed 2-3 times as much for a traditional clinical encounter versus a Telehealth encounter, which type of health care is incentivized? Telehealth is being "dis"-incentivized by the current fee-for-service model.

While reimbursement varies from State to State, the successes of Telehealth implementation, from a billing standpoint, have been inclusion of Telehealth as a traditional method of care. Whether delivery of healthcare into the home, or the extension of specialists into rural and underserved areas, there must be an equitable billing mechanism for Telehealth to be sustainable. Currently, Telehealth is reimbursed as an exception, or as a "less than" method of care delivery. States such as California and Missouri have incentivized the practice of Telehealth by State Medicaid provisions which reimburse equally for Telehealth services which meet certain technical criteria. Telehealth should be viewed as an accepted level of care versus an exception to the rule from a reimbursement standpoint whether delivering care into the home or treating a patient a rural clinic.

At UTHSC Memphis we have seen the opportunity and radical improvement to healthcare that Telehealth can afford. The implications can go far beyond the quality of life for our aging population, preventing hospital stays and nursing home enrollment. The significant cost of health care for our aging population is undeniable and we have demonstrated that the cost savings exist. Ultimately, a model must be created to ensure that Telehealth care providers are equitably reimbursed; otherwise there is no incentive to change traditional delivery of care. Telehealth is not a panacea and like any other form of healthcare practice there is potential for abuse; however, the potential of healthcare is almost limitless in the ability to provide quality medical care over distance.

Chairman Kohl, ranking member Corker, Senator Wyden and the committee, thank you for the opportunity to speak about the incredible opportunity that faces us regarding advancing the level of healthcare in our State and the country. I am happy to answer any questions you may have.

Senator WYDEN. Thank you very much.

Senator Corker's been so wonderfully patient all afternoon. I think it's just appropriate he start the questions.

Senator CORKER. Well, I will, then. Thank you.

I thank each of you for your testimony and your passion for this particular topic. I hope you don't have to come back in 6 years—

Mr. DISHMAN. I'm happy to—

Senator CORKER [continuing]. For the same—

Mr. DISHMAN [continuing]. Come back—

Senator CORKER [continuing]. Testimony, but—

Mr. DISHMAN [continuing]. Every 6 weeks, if that's what it takes.

[Laughter.]

Senator CORKER. Mr. Kuebler, the last panel was asked, by Senator Collins, just about the whole issue of privacy. I thought I'd ask you the same. Are there concerns that exist, from your standpoint, as it relates to patient privacy, using this type of technology?

Mr. KUEBLER. Well, I think the ONC did a great job of addressing the different opportunities for improvement that there are. From a patient adoption perspective, it's been interesting, the fact that the technology becomes relatively transparent after initial adoption. Privacy is the largest obstacle from a patient's standpoint.

Senator CORKER. Privacy is what?

Mr. KUEBLER. Is probably the most significant obstacle, from a patient standpoint. But, our patient data shows that in the high 90's—97, 98 percent of patients are equally as satisfied with a tele-encounter versus a face-to-face encounter.

Senator CORKER. As a person who, obviously, has been highly involved—we look at what happens with supply, and all the various avenues that people have access to something does create greater demand, right? We want everybody in our country to have healthcare and access to good quality care. I know that we talk a little bit about the fact that this is much less expensive, obviously, on a per-visit type of situation. Some of the technologies can prevent other issues down the road that are more expensive. But, is there also a component of this—and I'm not trying to be negative—but, with tremendously expanding access to healthcare, through this type of technology, even though it's at a lesser cost and it sounds like data maybe presents better outcomes—is there also a situation that creates much, much, much larger demand down the road, as broadband becomes more available and as people become more accustomed—our culture becomes more accustomed to using this type of technology? What are some of the issues that come with that?

Mr. KUEBLER. Well, let me try and tackle that from a couple different directions. From the provider perspective, obviously the goal is to reduce the cost—but from the payer perspective the goal to reduce payments out, or costs. From the provider perspective, there's still an associated cost of doing business in order to be able support the additional medical services that are being provided. So, the goal would be some sort of blending of the two, with agreements that would be directly between the payers and the providers, to make sure that the cost of carrying the additional clinical load

is also offset by the ultimate payments out that the payers are putting into the system.

Senator CORKER. Any other comments in that regard?

Mr. DISHMAN. I mean, I'd say, in our experience—and we've tested this with thousands of seniors, in particular—often frail, who have never used PCs or technologies in themselves—in their lives. If you think back to email, when we used to do surveys, at Intel, of people, about, "Do you want email?" People said, "No." Because it was before everybody had email, they didn't quite understand what it was. When email started, everyone thought, "Well, it'll replace the telephone. We'll never use the telephone again." What we now know is that email is a different way of interacting with each other. It didn't replace the telephone. We use telephone for certain things, and video conferencing for certain things, and email for certain things.

These e-care visits are not just a replacement for a face-to-face visit. They're a different kind of visit. I can give you an example from, just last week, a study that we're doing with veterans. Veteran, 90-some years old, woke up and had a rash on his chin, on the side of his face, lives in a rural part of the country, out in eastern Oregon. Today, our system says, to get that checked out, the veteran even has—either just does nothing and sits on it until it gets worse or makes a pilgrimage to a clinic or a hospital, some distance away, and has to schedule a full exam with doctor to get it looked at. With e-care technologies, the notion of a quick, "Hey, doc. Can you look at this?"—the answer is yes. The doc can do a quick look at this and say, "Yup, you need to come in, or nope, I can treat you at home."

So, what we're talking about is not replacing visits with e-visits. We're talking about adding e-visits as one of the tools that doctors can use, when medically appropriate, to mix up care. Because sometimes they need to go into the actual home of the patient, sometimes they need to bring them in, and more often than not they can do it virtually, especially if they have the data. That's been our experience in every study that we've ever done.

Senator CORKER. You mentioned the other experience you had had with other countries, and how nobody here owns getting this done. Obviously, it's not going to make much progress; you will be back every 6 years if that continues.

Mr. DISHMAN. That's very true.

Senator CORKER. Can you tell us who you think should own—which department of which Cabinet? I mean, what's the most logical place, here in the U.S. Government, for the central effort to take place.

Second, you mentioned the other European countries that have done it very differently. Well, how do they compare, as far as adoption of this type of technology, to us?

Mr. DISHMAN. The first question I have been thinking about this, and asking questions as I've been in D.C. this week. I think that—personally, what makes more sense to me is, the ONC, the Office of the National Coordinator, is trying to coordinate health IT across all of these groups. I think we need to add an administrator or an executive leader of the Office of National E-Care Coordination, and drive that e-care telehealth strategy. That would make—

perfect sense. I mean the challenge that we have is, it's not just the technology. You've got to work on workforce issues, and broadband, and payment reform. So, we need a place to stand where you can coordinate across all these agencies, to tackle that. That would be my best guess, personally.

To your second question, the EU, as a collective, and then European countries, in particular, have been focusing on three things. One is their broadband buildout, making sure that their specification for broadband is driven by e-care-use cases. My concern today, is that we are going to drive broadband to the rest of the Nation, but I'm not sure we're designing a pipe that's ready for where we're going, as a country, for e-care, where you can do the kind of "always on" secure data collection from the home; have your specialty-care doctor on a high-resolution video—this is happening in South Korea now—where you've got the senior, the family member, the specialty-care doctor, and the primary-care doctor all on rich video at the same time. That's one of the broadband network in South Korea now, and doable. I'm not sure we're building a pipe that's ready for that. So, before we go dig up rural America and lay fiber, let's make sure that our specification's are going to enable that fundamental infrastructure.

The second thing that Europe is working on is workforce. Knowing that they have to train family caregivers to be an active part of the care coordination team, and they've got to train nurses and clinicians on how to integrate e-care technologies into their workflow. They're ahead of us, because they've already developed curriculums for virtual telecare workers and saying, you know, "What's the right mix of virtual visits for a doctor to do in a day, and in-clinic visits?" and really starting to understand those kinds of things.

The third is really funding the fundamental research. This is the billion euros that they put into what are called "ambient assisted living." Our research, that we fund at Intel, the universities—the hundred university grants that were done, by and large those American researchers are now trying to collaborate and partner with overseas researchers, because there's no program here for them to go up and do larger-scale studies. That's what really worries me, as a citizen and as somebody in an American-based company. I don't want all that intellectual property and that energy and that know-how to, sort of, go overseas.

Senator CORKER. Well, thank all of you for your testimony. I look forward to pursuing this further.

Senator Wyden, thank you. I'm—like you, I've got a 3:30 situation I've got to step to. But—

Senator WYDEN. Thank—

Senator CORKER [continuing]. We've had some great testimony. I want to thank you for your leadership on this issue.

Senator WYDEN. Thank you, again, for your patience. I know we're going to work together on it. This is one of those opportunities to get more value for the healthcare dollar. We have talked often about it.

Let me pick up on this question that Senator Corker just started into with, really, all three of you, because I think you've got the alphabet soup of agencies. You've got the Center for Medicare and

Medicaid Services, that's, you know, CMS. You've got FDA, the Food and Drug Administration. Clearly, the Federal Communications Commission works in communications. I just imagine trying, around here in the U.S. Senate, to watch this get spread far and wide through all of these various and sundry, you know, committees. I sit on the Finance Committee and the Budget Committee, which has a key role in Medicare, which has jurisdiction over the Department, you know, of Health so you can get into some of these issues. But, then you have to send all of this off to the Federal Communications Commission, because this has, clearly, a communications role.

I think, for purposes of this afternoon and the lateness of the hour, one of the questions I'd like to ask all three of you is,—it seems to me that right at the heart of what needs to be done is to change this embedded, outdated reimbursement policy for these technologies. Do all three of you agree with that?

Mr. Dishman, yes?

Mr. DISHMAN. Absolutely.

Senator WYDEN. Felder, yes? Mr. Kuebler, yes? All right.

The reason I believe its outdated is, it seems to me, by its very nature you've got to have video and audio. It's got to be at remote locations. I mean, it essentially precludes the very benefits that we'd like most to secure for older people, which is the opportunity to age at home. Is that right?

Mr. DISHMAN. Absolutely.

Senator WYDEN. So, by way of starting this—and I said, on the Finance Committee, where at least we've got jurisdiction over the Department of Health and Human Services—strikes me, that's where you ought to start the revolution, to really start, you know, bold fashion, to get these products out on the playing field. Do the three of you agree with that?

[All witnesses nodded in the affirmative.]

Senator WYDEN. OK. That, leaves the other question of, How do you take the array of alphabet soup agencies and in some way consolidate them so you can get these devices out there in something resembling a timely fashion? Because I see, for example, once we get over reforming this outdated standard, for purposes of Medicare reimbursement, you still have to run the gauntlet, particularly, say, at the Federal Communications Commission; we've got two health agencies involved, you know, under the auspices of the Department of Health and Human Services; and then, you've still got to go off and get into the communications area.

So, do any of you have any thoughts about how you'd pull these three agencies together in something that would allow these products to be evaluated in a timely way?

Mr. Dishman?

Mr. DISHMAN. Well, I'd—in part say, go where the momentum already is. I mean, I've read the entire health reform bill, actually three times. It was hard, but I did it.

Senator WYDEN. I read it once. [Laughter.]

Mr. DISHMAN. I've read it three times, because it took that long for me to be able to understand it. But, what I would say is, there wasn't a national strategy on e-care in the bill. But, I would say there are lots of places where there's momentum that we can build

on top of. Those are, for me, medical home, accountable-care organizations; Independence at Home, your legislation. Those places create openings, because you're talking about paying for outcomes and putting coordinated-care teams together. We just want to make sure that those teams then have the option of experimenting with the different mixes of in-home, in-clinic, and virtual or e-care visits.

I'd say, go where that momentum is. I don't think there's anything precluding us from doing that in those domains. I would say the comparative effectiveness money, we need to make sure we spend some of it comparing e-care to in-clinic care, and not to let all of that money go to just comparing traditional medical devices or pharmaceuticals. So, that would be the last piece—I'll reiterate what I said earlier—we need an executive owner whether it's at ONC or wherever the person is. If we don't have an executive owner who's driving this e-care and telehealth strategy, I don't think we will be continuing these hearings, 6 years from now, and 6 years after that.

Senator WYDEN. Mr. Felder?

Dr. FELDER. I'm a—

Senator WYDEN. Mr. Kuebler?

Dr. FELDER [continuing]. Great believer in free enterprise, as evidenced by the explosion of iPhone apps that are medically related. I think what we need to do is just make sure we don't have FDA and others impeding consumer-demand, government expenditures aren't necessary. There is going to be tremendous consumer pull in this area. So, I think the two are going to meet in the middle, but I would venture that the private enterprise approach is going to quickly overtake and swamp out any government initiative in this area.

Senator WYDEN. Well, I share that view. One of the reasons I want something along the lines of a one-stop process for evaluating these devices and getting them out on the playing field is that I think the genius of the free enterprise system could be impeded because you've got all of the agencies strewn all over Washington with a hand in all this. What Mr. Dishman said is, he'd like to have the health agencies, in effect, take the lead, because that's where the expertise is, and that's certainly going to be part of the debate. But, to realize the genius that Mr. Felder has talked about is—I think you've got to have a one-stop process for getting these products evaluated, balancing the various interests, be it, safety and cost-effectiveness and hard data, on quality, the various interests that we've been talking about all afternoon.

Mr. Kuebler, did you want to add anything?

Mr. KUEBLER. I'd just like to concur with Mr. Felder and Mr. Dishman.

Senator WYDEN. All right.

Let's talk about something else that I think is going to be somewhat of a challenge in this area, and that is that we've all come to love our iPhone applications. We have these—staggering array of, iPhone applications. But, sometimes I wonder about the implications of somebody reading a restaurant review on Yelp that somebody's e-care data, in effect, then is lost in an Internet traffic jam. I think that we continue to have real challenges with respect to access of essential services.

Is it appropriate for the Congress or the Federal Communications Commission to start thinking about priority access in this area of e-care? I mean, in effect, an HOV lane for e-care data for wireless broadband.

I come to this having thought a fair amount about it, and I haven't really reached any judgments about how you'd want to do it, but, at some point, Americans are going to ask some questions about whether everybody ought to be reading movie reviews, when somebody who needs, for example, emergency services gets caught in a Internet traffic jam.

Any thoughts on this? Talk about trying to balance issues relating to the role of the private sector and the public interest. I think this is right at that intersection.

Mr. Felder? I would just go right down the row. Mr. Kuebler?

Mr. KUEBLER. I think we saw earlier, with some of the burps and hiccups with the video conferencing, some of the issues that can be plagued by going over commodity Internet. So, this—whether you call it a HOV lane or a “quality of service” lane, would certainly scale. That is one of the issues, especially in live consults—

Senator WYDEN. You'd be for it.

Mr. KUEBLER. I think it's—

Senator WYDEN. You'd be—

Mr. KUEBLER [continuing]. Definitely—

Senator WYDEN [continuing]. For the—

Mr. KUEBLER [continuing]. Something that's worth exploring.

Senator WYDEN. Yeah.

Mr. Felder.

Dr. FELDER. I'm not sure of the exact infrastructure, but a stable and secure Internet is something we certainly don't have right now, particularly stability. It goes in and out, as we've just seen.

Mr. DISHMAN. I agree, in two ways. There's a practical near-term and a long-term. The near-term is, we need to explore the possibility of accelerating access to people for broadband in today's marketplace for health purposes. If you're coming out of a hospital discharge situation, and you need a broadband-connected telehealth solution to help you recover for that first 30 days, so you don't get a hospital admission, but it takes 45 days for you to stand in line to get the broadband provider to come out and hook it up to your house, then we've got a problem.

Longer term, Senator Wyden, I think you're right onto something. We need to be exploring use cases for the technology—lets say, you know, heart rate data for a critical patient needs to be extra sure it gets there well ahead of something like a recipe being exchanged. I'm not an engineering expert, but we need the experts to think through those problems and solve them.

Senator WYDEN. Mr. Dishman, as you know, I authored the provision in the health reform law, promoting Independence at Home, in effect, launching a variety of programs to address the needs of the highest-cost folks on Medicare, the folks with multiple chronic conditions. You would use a house call team approach. Those that participate in this, the Independence at Home providers, are required to achieve minimum savings of 5 percent, and to show that they can achieve these savings.

It seems to me that e-care is a very good way to prove this. I think it's also a good way to get at this issue, that Senator Collins apparently talked about in my absence, that older people are going to say, "I don't know so much about these products. I'd like to know more about them." It would seem to me that the Independence at Home providers would be a natural way to get older people, who chose to do it, comfortable with the products and devices, and be in a position to use them.

So, I think this is kind of a twofer. It gets you launched with Independence at Home, and it also gets at something of an educational effort that's going to have to be part of any e-care program.

What are your thoughts? Let me thank you. I consider you sort of one of the godfathers of the Independence at Home effort, since you and many you work with have educated me and our staff on it. I think it's almost an appropriate way to wrap up, because, you know, Independence at Home, in my view, is going to be a significant part of Medicare's future. I mean, if you look at the fact that a substantial number of Medicare patients on any, you know, given day are going to require these kinds of services—and here's an opportunity to really target savings, because we know that there is great opportunities to move away from the model where they have to come to the office—this is the future.

So, close, if you would, with an assessment of what Independence at Home can achieve, using e-care.

Mr. DISHMAN. I think an e-care-enabled Independence at Home strategy is the essence of what our health reform is supposed to be doing. My only complaint about Independence at Home is that the Secretary has the option of waiting until 2012 to implement it. I believe there are 60 or 70 organizations across the United States today who are ready and can go do Independence at Home now. Their big challenge is, they can't scale, because they were not going to have enough staff, and they're going to have to use e-care to help them do, themselves. Intel and Continua have been supporters of Independence at Home since day one. A technologized capability brought to that is key.

I say we can actually look to the VA here, as well. If you think about the home-based primary-care program that the VA uses to care for seniors with many chronic diseases, who would otherwise be in a nursing home or in a hospital, but in their own home, and you think about the work that's a separate program at the VA, on telehealth, the merger of those two is what we're talking about with Independence at Home. I'm eager to start working to make that a reality, and not wait til 2012 to do that.

Senator WYDEN. Well, don't completely despair. One of my favorite aspects of the legal consequences of legislation is that no current Congress can bind future Congresses. Let's go out there and show that we can get Independence at Home more accessible and more quickly than people, this year, thought. This isn't going to be the only provision that is going to be sped up. I look forward to working with you on it.

Mr. Felder and Mr. Kuebler, anything else you'd like to add? Further thoughts?

[The two witnesses shook their heads in the negative.]

Senator WYDEN. Thank all of you for your patience, again. My apologies. We're going to be working very closely with you. This is an exciting topic. Obviously, you all are on the cutting edge, with so many of these devices, and innovative thinking for innovative products, and we look forward to working with you.

With that, the Committee on Aging is adjourned.

[Whereupon, at 3:48 p.m., the hearing was adjourned.]

A P P E N D I X

MR. DISHMAN'S RESPONSES TO SENATOR KOHL'S QUESTIONS

Question. I have heard you speak about the many benefits of using health care technology in the home. Are there any disadvantages to using this type of technology for patients and their family members?

Answer. Although remote patient monitoring consistently shows improvements in health outcomes, reduction in hospital admissions and length of stay, issues of implementation can occur around four primary categories:

1. Device or instrument calibration,
2. Untrained use of the devices
3. Unauthorized users
4. Lack of personal contact

CALIBRATION

Although the calibration activity is typically managed as a factor for FDA 510(k) clearance, the devices can and should go through a routine calibration schedule recommended by the manufacturer. (Some may require more stringent settings and some are designed specifically for rugged consumer use and may never need recalibration.) The schedule and need for calibration, or other maintenance, is determined by the manufacturer. This can be a challenge for the patients using the vital sign capture technologies to follow all the manufacturers' guidelines for calibration of their home use devices. The risk of a system not properly transmitting data to clinicians may create not only misinformation that the clinician may use in diagnosis and treatment, but also create a false sense of security by the patients.

TRAINING

Untrained user issues are also typically handled by the FDA 510(k) clearance process for user design and actual use parameters. Once again, the devices are designed for this purpose in field use and must also be designed with an appropriate user interface for the intended user, taking into account the environment where it will be used, a user's physical limitations and the user's familiarity with technology. For example the blood pressure measurement, asking a patient to push one button to turn on a device and again to do the measurement creates unnecessary complexity for what is essentially a simple measurement. Where it becomes very complex or difficult for the patient is with multi-use instruments with several buttons to push and sometimes several cables to connect or disconnect from the telehealth device. Designing and delivering the correct UI design is essential and required by the FDA.

The system may demand that caregivers, already overburdened, also provide technical support. Patients living alone without caregivers might not be able to use a sophisticated system on their own. Thus, the people who need it the most may not be able to benefit or may underutilize the features. They may, for example, not know how to activate a system to report questions at times outside of scheduled health sessions on the system.

It is possible that in the course of reporting a symptom on a survey, patients won't be able to provide related symptoms or contextual factors that could come up in conversation with a clinician. This could potentially lead a clinician to overlook a more unique health condition.

UNAUTHORIZED USERS

In the home setting, one cannot always control who uses the system, particularly when curious family members would like to use the vital sign devices to check their own measurements. Allowing access to devices by children or others can be disruptive to the patients or to the clinician who may be receiving data that is not from the patient. Additionally, using a community device where more than one person inputs data has the potential to be confusing if the data somehow is not clearly tagged to an individual reporter. Several devices already have the capability to manage more than one user which requires effective training to ensure proper use. We are

also designing security standards into the guidelines to ensure we have the right person identified, which becomes critical when devices are intended to be shared in multiple locations: work cafeteria, remote clinics, shared facilities, etc. This escalates the importance for secure identification.

LACK OF PERSONAL CONTACT

The lack of physical contact with the patient was raised as a disadvantage in one study (Sandberg et al. 2009), and may also be an issue for patients.

*Sandberg J, Trief PM, Izquierdo R, Goland R, Morin PC, Palmas W, Larson CD, Strait JG, Shea S, and Weinstock RS. A qualitative study of the experiences and satisfaction of direct telemedicine providers in diabetes case management. *Telemed J E Health* 2009; 15(8): 742-50.*

Question. What types of training currently exists to teach family caregivers how to deliver complex care using health IT? How successful are these training programs?

Answer. The Veterans Administration (VA), which has the largest deployment of remote patient monitoring devices, attributes much of the program's success to the extensive training programs enacted for clinicians, patients and caregivers.

Three training centers have been established with discreet responsibility for the major division within the VA for Telehealth:

The Rocky Mountain Telehealth Training Center provides training and support to staff involved in the delivery of general-telehealth services, enabling real time telehealth through a telecommunications link. This link allows for instantaneous interaction via video conferencing between the patient and the provider or even between two providers regarding a single patient. Care Coordination Home telehealth training is provided by the Sunshine Telehealth Training Center to provide best practices for communicating health status, and capture and transmittal of biometric data. Care Coordination Store and Forward (S&F) Telehealth training is conducted in the Boston S&F Telehealth Training Center for video, audio and clinical data transmitted to a medical facility.

"Training center curricula are standardized and we emphasize virtual training whenever practical and possible. The three VA telehealth training centers have enabled over 6,000 staff to be trained and have helped sustain a rapid pace of telehealth expansion that makes the VA a recognized national leader in the field of telehealth. The VA has also implemented an internal system to assess the quality and consistency of its telehealth programs at a VISN level that is conducted in each VISN biannually."

Adam Darkins, MD, Chef Consultant, Care Coordination, Office of Patient Care Services, Veterans Health Administration, Senate Committee on Veterans Affairs, February 26, 2009

Each mode of telehealth has its own training center, though most staff training takes place over the network. "The VA has an employee education system," Darkins explains. This system provides content and dedicated training to 18,000 computer desktops throughout VHA institutions. There are satellite broadcasts across this network every two months and an annual virtual conference, as well as specialised training for services like telehealth as needed. Last year, the VA trained 1,600 staff for home telehealth, 96% of whom received their training remotely over the agency's vast electronic infrastructure. More than 1,000 employees have been trained on the clinical videoconferencing equipment, 90% of them remotely.

Adam Darkins, eHealth Europe, October 12, 2009

CAREGIVER TRAINING THROUGH TELECOMMUNICATIONS AND WEB-BASED EDUCATION

Training the caregiver through technology is illustrated by the work of Dr. Carol E. Smith, RN, PhD. Her program of research emphasizes practical, cost-effective methods designed to reach family caregivers of diverse ages, education, income, and geographic residence. Her research has demonstrated that relatively low cost technologies can be used effectively to reach and support informal caregivers across all social economic status and age groups from rural and inner city locations. Additionally, one of Smith's family caregiving interactive websites was selected for the International Nursing Scholar's Society Pinnacle Award for excellence in computer-based public health education. The current clinical trial website tests "virtual nurse caring" to determine what aspects of nursing can be safely conducted through the internet.

<http://reporting.journalism.ku.edu/fall06/fred-musser/2006/10/real-time-with-virtual-nurses.html>

A second example is reported in *Telecommunications Technology as an Aid to Family Caregivers of Persons With Dementia* by Sara J. Czaja, PhD and Mark P. Rubert, PhD, Department of Psychiatry and Behavioral Sciences, University of Miami School of Medicine, Miami, Florida. (*Psychosomatic Medicine* 2002; 64:469-476). The results of this study demonstrate how current information and commu-

nication technologies can be used to help caregivers meet the challenges of caregiving and improve the quality of life for caregivers.

The data reported are based on responses to the usability questionnaire at 6 months from a sample of 44 caregivers. Overall the results indicate that the system is easy to use and the caregivers find it valuable. The most common reason that the caregivers use the system is to communicate with other caregivers, especially those who are not nearby. The caregivers, especially the Cuban Americans, reported that the system facilitated their ability to communicate with family members and their therapist. The caregivers also indicated that they found participation in the "online discussion" groups to be very valuable and also found the "online resource guide" useful.

A third example is found in the work of from a study reported in *The Journal of Applied Gerontology* 2010, doi:10.1177/0733464810366564, April 7, 2010 in which a small control group 169 patients, evaluated the acceptability and feasibility of telehealth videoconferencing for pre-clinic assessment and follow-up in an inter-professional memory clinic for rural and remote seniors. Patients and caregivers are seen via telehealth prior to the in-person clinic and followed up at 6 weeks, 12 weeks, 6 months, 1 year, and yearly. On average, telehealth appointments reduce participants' travel by 426 km per round trip. Findings show that telehealth coordinators rated 85% of patients and 92% of caregivers as comfortable or very comfortable during telehealth. Satisfaction scales completed by patient-caregiver dyads show high satisfaction with telehealth. Follow-up questionnaires reveal similar satisfaction with telehealth and in-person appointments, but telehealth is rated as significantly more convenient. Predictors of discontinuing follow-up are greater distance to telehealth, old-age patient, lower telehealth satisfaction, and lower caregiver burden.

DR. ROBIN A. FELDER RESPONSE TO SENATOR KOHL'S QUESTION

Question. Can you give us an idea of how much some of the in-home health monitoring devices you mentioned cost for families?

Answer. Costs are currently varying widely for eldercare monitoring technologies. For example equipment installation costs are between \$200 and \$2,000. Monthly monitoring fees vary between \$50 and \$100. Some of this variance is related to the extent of the issues that are monitored and the degree of interventions that are provided. Market pressures will undoubtedly bring these costs down closer to \$250 for basic monitoring equipment and under \$100 a month for monitoring services.



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**Statement to the
 U.S. Senate Special Committee on Aging
 Regarding
 Aging in Place: The National Broadband Plan and
 Bringing Health Care Technology Home
 April 22, 2010**

We applaud the Committee's leadership, for so quickly following up on the important advances in the Patient Protection and Affordable Care Act for Medicare and Medicaid beneficiaries aging in place. In particular, we look forward to the positive impact that will arise for patients from various provisions in the Act including the Medicaid "health home" waiver (section 2703), the Medicare demonstrations of Independence at Home (section 3024) and accountable care organizations for chronic care (section 3022), and the new Center for Medicare and Medicaid Innovation (section 3021). We expect that telemedicine services will play a large and important role in each of these new programs. In addition, the implementation of numerous other provisions could be facilitated through expanded telehealth coverage and access.

We also applaud your quick response to the Federal Communications Commission's National Broadband Plan and its strong, innovative chapter on health care. In large part, the FCC's work is valuable because it addressed issues beyond the FCC's jurisdiction, notably government barriers -- statutory, regulatory, and administrative -- to sustaining broadband deployment and to maximize its benefit. We strongly recommend the FCC's health care findings and recommendations to you for support and, as needed, approval.

Expand Medicare and Medicaid Applications

The biggest barriers to telehealth for aging in place, in particular, and senior citizens, in general, are in Medicare statute. In part, the Medicare barriers result from a prescriptive text that is tied to the technology applications at the time. In contrast, several states have enacted insurance laws that are more accommodating of evolving health applications. For example, last June, the Oregon enacted a requirement that a "health benefit plan must provide coverage of a telemedical health service if:

- (a) The plan provides coverage of the health service when provided in person by the health professional;
- (b) The health service is medically necessary; and
- (c) The health service does not duplicate or supplant a health service that is available to the patient in person."

Quality healthcare through telecommunications technology

An important restriction in Medicare's coverage of telehealth is the lack of coverage for video conferencing, the most common telehealth method, for beneficiaries in metropolitan areas. Thus, 79% of Medicare's beneficiaries are blocked from accessing these cost effective, vital health services. In terms of fast evolving technology, it should be noted that soon mobile phone devices will be able to conduct video conferencing.

Medicare law essentially states that a beneficiary must be served at site located "in a county that is not included in a Metropolitan Statistical Area." This bars reimbursement in all but the most rural parts of America. Every state has at least one Standard Metropolitan Statistical Area (SMSA); New Jersey, Rhode Island and the District of Columbia are totally in one or more SMSAs. Also, many Congressional Districts are totally in one or more SMSAs. In the U.S., there are 363 SMSAs, encompassing 1092 counties, ranging in population from Carson City, Nevada with about 55,000 on up. Below is a listing the percentage and number of beneficiaries living in an SMSA for the states represented on the Committee:

	% Metro	# Metro		% Metro	# Metro
Alabama	66.8%	520,254	Missouri	67.6%	637,802
Arkansas	52.0%	257,149	New York	90.2%	2,567,918
Colorado	83.0%	460,755	Oregon	69.8%	393,761
Florida	92.6%	2,897,134	Pennsylvania	82.4%	1,797,324
Georgia	73.5%	811,945	Rhode Island	100.0%	175,132
Indiana	74.6%	699,012	South Carolina	72.2%	498,660
Kansas	56.6%	232,355	Tennessee	66.7%	645,793
Maine	53.6%	131,569	Utah	85.0%	214,694
Minnesota	63.6%	462,950	Wisconsin	66.7%	568,893

None of these constituents can receive the benefits of telemedicine under current Medicare law.

A second restriction is that Medicare essentially does not cover remote patient monitoring, which has proven critical for managing chronic conditions and keeping beneficiaries out of expensive hospitals and nursing homes stays.

A third restriction, important for aging in place, is that the major therapist categories, physical, occupational, speech-language pathologists and audiologists, are not covered for telehealth – even to the extent they are covered for other Medicare services.

Under Medicaid, home telehealth may be provided under waiver but only seven states have established such waivers and two more have demonstration programs.

It should be pointed out that home telehealth and remote monitoring benefits both the aging and younger patients with disabilities. Although the primary focus of the Committee is on aging, the inclusion of all Medicaid recipients with disabilities for telehealth services yields economies of scale, efficiencies, and continuity of care.

Allow Telemedicine to Meet a Range of Needs of Older Americans

SERVICES - The most common uses of home telehealth are for monitoring chronic conditions by home health agencies and physicians. However, it is also important to accommodate other clinical applications as well, notably telemental health for depression, and telerehabilitation for stroke care.

DELIVERY MODELS - Since the Medicare home health benefit is very short-term focused, other service providers, such as Federally-qualified health centers and Indian Health Service and tribal entities, should be eligible to participate and may be more useful for long-term chronic care.

ACCESS - On the community level, there are two major types of access problems – health provider shortages and transportation. Problems with provider shortages occur in both rural and urban areas. Federal designations of health professional shortage areas, medically underserved areas, and medically underserved populations highlight these concerns. Transportation problems are multiple and diverse. While federal and other public funds for special transportation services address this issue, they fall short. Notable federal programs providing transportation assistance include the Safe, Accountable, Flexible, and Efficient Transportation Equity Act - A Legacy for Users (SAFETEA-LU) programs under the section 5310 formula program for elderly persons and persons with disabilities and the section 5317 New Freedom program. On an individual level are a variety of circumstances that make any travel difficult for many seniors, notably those with disabilities and other limitations on mobility, medical conditions and driving cessation/reduction. Telemedicine can be an important part of the solution to these problems of access.

These problems highlight the need to not only get seniors to needed services, but, through the use of telemedicine, to get needed services to seniors.

Conclusion

ATA believes that the problems and opportunities presented here can be effectively addressed through the additional use of telemedicine.

We look forward to working with you on health delivery reform and using technology to better serve seniors and taxpayers.

BARRIERS TO TELE-HEALTH AND REMOTE PATIENT MONITORING

COMMENTS BY

GEISINGER HEALTH SYSTEM**SENATE SPECIAL COMMITTEE ON AGING****MAY 6, 2010**

Thank you for the opportunity to submit this listing to the Senate Special Committee on Aging.

At Geisinger Health System, we serve a population that is poorer, older, and sicker than the national average. Most of our patients have multiple chronic diseases, such as diabetes, high blood pressure, and lung disease. Our patients have difficulty navigating through a complex healthcare system. They need help and we have made a concerted effort to put into place electronic and other innovative methods that will provide them with the assistance to maximize their ability to get care.

The "Barriers to Tele-Health and Remote Patient Monitoring" include:

- Lack of uniform coverage/reimbursement from payors.
- Lack of wide-scale reimbursement. This is a key issue that:
 - impedes the ability of earlier stage, innovative companies to raise the requisite venture capital to grow;
 - represents a true "chicken or the egg" scenario — in order to reimburse, providers want to see evidence of large-scale efforts that demonstrate quantifiable ROI and outcome improvement. Vendors, on the other hand, face great difficulty getting that type of validation en masse in the absence of reimbursement.
- Limited outcomes data to date documenting value:
 - Who is the right population to utilize these tools;
 - What level/types of telemonitoring drive most value;
 - What level of intensity is needed;
 - How many devices are needed.
- Gaps in the healthcare delivery model to appropriately incorporate these tools to optimize outcomes:
 - Need for efficient way to share data back to care team
 - Need for appropriate team members to oversee implementation of these tools to drive success; for example, access to case managers to educate on the use of, value of, how to incorporate into care plan.

- Challenge of providing equipment in patient's homes and designing monitoring programs to assure appropriate use.
- Varying levels of technology available in rural settings; i.e., variable phone lines for transmittal. Alternative is more costly.
- Competing technology and competing agendas with different providers:
 - Home health vs. in-home cardiology monitoring.
- Advancing technologies for populations that most need it but may be least prepared to manage it (elderly with no previous experience with internet).
- Many telemonitoring vendors/companies are manufacturer centered and focus needs to be on logical design, implementation and patient-centered model that allows for provision.
- Most vendors have developed interfaces with a limited set of peripheral devices made by a select group of manufacturers, as opposed to offering a device agnostic solution that can exchange information from any FDA-approved device, regardless of manufacturer.
- Capital for equipment/devices is increasingly difficult to secure as capital budgets continue to dwindle or be managed on a very conservative basis.
- Anecdotally, there remains a "Big Brother" mistrust issue in which a relatively small, but not insignificant, portion of eligible monitoring candidates simply will not agree to having personal health information (PHI) transmitted from their homes, for fear of having that data used against them.
- Not being able to rely on the privacy practices of potential health-information exchange (HIE) partners hinders development of HIEs and endangers patients.
 - Legislate a core set of responsibilities to safeguard patient privacy that would be binding on all entities that manage patient information.

Thank you, again, for the opportunity to submit this listing of "Barriers to Tele-Health and Remote Patient Monitoring" to the Senate Special Committee on Aging.

If you have questions or would like further information, please do not hesitate to contact:

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