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Health Care Technology Home”**

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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.*^x

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.*^{xi}

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.

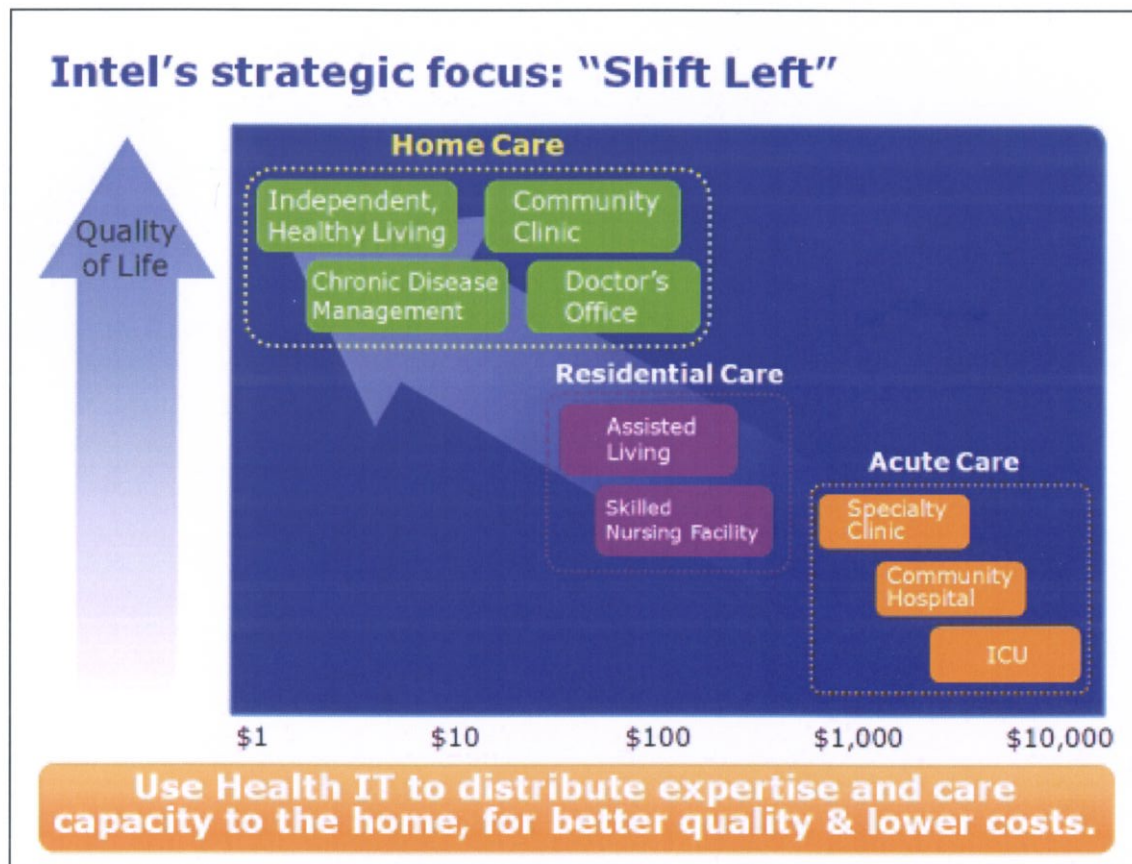
Phase III: Get Coordinated: All providers regularly use a wide array of care coordination tools (shared records, shared virtual whiteboards, multimodal messaging, care plan tracking, etc.) with one another and with the patient and family members, with each constituent playing his or her role.

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.”^{xii} 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.

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

ⁱⁱ See “An Aging World: 2001,” November 2001, by Kevin Kinsella and Victoria A. Velkoff. At <http://www.census.gov/prod/2001pubs/p95-01-1.pdf>.

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

^{iv} For a brief description of one of the ethnographic studies we have done on aging, see <http://www.intel.com/healthcare/hri/pdf/gaexperience.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/itj/2009/v13i3/ITJ9.3.1-Global-Aging.htm>.

^v 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, Umut Ozertem, Misha Pavel, Matthai Philipose, Kevin Rhodes, Sengul Vurgun.

^{vi} See <http://www.intel.com/healthcare/ps/healthguide/>.

^{vii} See Sheri Reder, 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.

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

^{ix} See http://www.trilcentre.org/falls_prevention/falls_prevention.474.html.

^x 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.

^{xi} See , Feb 7, 2010

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

^{xii} 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.