

Testimony of

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before the

**Special Committee on Aging
United States Senate**

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Chairman Craig, Senator Breaux and distinguished members of the Special Committee on Aging, thank you for this opportunity to present testimony on opportunities and challenges of using technology to support older adults and caregivers.

At the MIT AgeLab I lead a team of researchers, students and global companies that seek to develop new ideas and technologies to improve the quality of life of older people and those that care for them.

Our work is “use-inspired basic research.” While broad in vision, the AgeLab seeks to be profoundly practical in improving everyday living -- transportation, health, communications, work, personal planning & decision making, play, recreation, and caregiving, while seeking to advance basic understanding of how aging impacts and is impacted by social, economic and technological systems.

Our research is motivated by a shared belief that the appropriate use of technology, along with innovations in its delivery, can have a significant impact on the quality of life for older adults, their families and caregivers.

Based within MIT’s School of Engineering’s Engineering Systems Division (ESD), our activities involve an array of disciplines including engineering, computer science, human factors, health and medical sciences, design, social work, gerontology, management, marketing, and the social and behavioral sciences. We take a systems approach to technology and aging – looking at technology as only a partial solution. Our research aim is to rapidly move innovations from the laboratory bench to people’s lives as soon as possible to benefit today’s as well as tomorrow’s older adults. To achieve this, the AgeLab seeks to transform technology into true innovation by understanding how it is used and adopted by older people and caregivers in the context of behavioral, business and policy realities.

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Confronting a Longevity Policy Paradox

The hearing today should be viewed as a celebration of policy success and technology's promise. While making the long list of humanity's successes over the last century, many of us listed space travel, medicine, the Internet, few actually noted that we have made large strides in achieving the historic pursuit of humankind – longer life.

One hundred years ago life expectancy was less than 50. Today, with years of public and private investment we have made advances in everything from sanitation, to medicines, to healthcare, to nutrition, adding nearly thirty years of life. Now most in the United States can look to living well into their 70s – where the fastest growing part of the population is now 85+.

This great policy success leaves us with a policy paradox – a longevity paradox. Now that we are living longer what will we do with our thirty year longevity bonus? How will we live, work, play, care and remain connected productive Americans in old age?

Sarah Knauss lived to 119 years of age. When asked about her life and why she enjoyed her longevity, she was said to enjoy longer life because she “had her health and she could do things.” That is today's policy challenge and opportunity, not to simply live longer – we have achieved that for many – now the challenge is to live better.

Technology in many ways has enabled us to live longer lives, it is only appropriate to ask how technology can help us live better lives. My testimony is in two parts. First, a snapshot of selected problems in aging and technologies that may manage or remedy those problems, and second, a recommendation to the Committee that we not become so focused on devices and technology-enabled systems that we lose sight of the nation's need to establish a sustainable process of innovation that goes beyond developing technologies alone, but seeks to make the institutional and policy changes necessary to make these solutions available, acceptable and affordable to all Americans. Though the main focus of our discussion today is on the technology, the real policy opportunity is to align an increasingly activated public, emerging interests and the availability of technology to exact real improvement in the lives of older people and their families.

A Converging Coalition of Expectations

The aging and health of today's older adults and their adult children, the baby boomers, is an expectations game. Historically the public definition and debate of aging and long-term care was to craft a safety net. Today, it is about supporting

the public's expectation that we can live longer AND better. Because it is about expectations, it has become more political. Older adults and baby boomers are now demanding solutions to help them age well, independently and with dignity. They are becoming knowledgeable and activated looking for both public and private institutions to provide innovative services that rely, in part, on technology.

However, in addition to older adults and adult children, there is a new stakeholder in aging – employers. Similar to the years before worksite day care became the norm, not the novelty, employers are finding that eldercare is not the worker's dilemma alone, it is their issue as well. One in four families provide care to an older adult. A national survey reports that at least 50% of employees in Fortune 1000 firms see eldercare as a greater issue than childcare in the workplace. Somewhere in these halls Senator Dirksen was credited with saying (I am paraphrasing) "a billion here and a billion there and soon we are talking real money." Mr. Chairman, at least one study suggests that eldercare is costing "real money" to employers – an estimated \$29 billion in lost productivity. Business, along with the families of older adults, is now looking for novel ways to address the needs of their employees and an aging population.

Seeking to stem the explosive cost of aging services and healthcare, the Federal and state governments are looking to technologies to deliver services more efficiently. Nearly 25 cents on the dollar of state budgets are going to aging and health-related services. In response to this fiscal dilemma and the needs of older people, Governor Dirk Kempthorne of Idaho and Chairman the National Governors Association, launched his initiative "A Lifetime of Health and Dignity: Confronting Long-Term Care Challenges in America. Under Governor Kempthorne's stellar leadership, this initiative has identified the potential of technology to assist individuals and state agencies. Moreover, the initiative has generated a thirst for knowing more about these innovations as well as a demand for assistance to implement them today.

There is growing awareness and alignment between older people, their families, employers, public agencies and others that technology may offer significant benefits. This political reality, combined with the fact that technology is now, generally speaking, cheaper and widely available, more usable (we are still plagued by technology understood only by the technologists), and increasingly linked to services that provide real value to people. As indicated by others presenting testimony today, and in the recently released National Academies book, Technology for Adaptive Aging, which many here contributed to, a wide range of technologies that may find their way into our homes, workplaces, cars, retail experience, long-term care settings, on, and inside our bodies have the potential to assist, monitor, remind, and support older people and caregivers alike.

Innovations in Decision Making, Health & Transportation

Although many look to technology to help us do something better, technology used appropriately does not help us do things better, it changes what we do, alters our expectations and brings new players to the table. Three project areas we are working on at the MIT AgeLab illustrate this.

Retail Health – Many of our decisions around health and wellness are not made in the doctor's office where information and awareness is plentiful, nor are they made entirely in the home. Our daily shopping experience in the drug store and grocery store is the venue of much of our health decision making. The MIT AgeLab is working on developing the concept of Retail Health. An increasing number of retailers are providing screening services for diabetes, obesity, hypertension, etc., in the store. At the AgeLab we are seeking to leverage this opportunity, available technologies and the shopping experience of older adults, caregivers and boomers to provide information at the "point of decision" – in the shopping aisle. One such project includes the use of a personal advisor that reconciles your personal diet, lifestyle and medical regimen helping you or a caregiver make choices between food products. Rather than providing generalized benchmarks for the "average 65 year old diabetic" the MIT AgeLab personal advisor uses a smart handheld or shopping cart to help the consumer make a selection between products, balancing decisions that may include salt, fat, or other ingredients.

A related project is developing a "connected-kiosk" that builds upon the frequently seen in-store platforms that can be used for weight, blood pressure, measurement, etc. The MIT AgeLab's project seeks to provide the means to take this service several steps forward, collecting the data for the user, providing suggestions based upon their needs and enabling them to connect (in real time) with a health specialist that may be based at one of the many major health centers that are practicing telemedicine across the country, e.g., Massachusetts General Hospital – Partners Telemedicine.

Our Pill Pets promise to help older adults adhere to their medication schedule. Similar to the child's toy from Japan that requires you to play with the device or it grows sick and eventually dies, the Pill Pet requires you to play with it, report that you took your medication or it too becomes sick and dies. If the Pet should pass on, it can only be brought back by the pharmacist. Research indicates that play, emotion and guilt may serve as greater motivators than the rational approach of simply reminding the patient – the Pill Pet is an attempt to apply all human dimensions of behavior to health.

A Check-Up-A-Day – Nearly 110 Americans manage at least one chronic disease another 70 million manage at least two. Adults 50+ are the most likely to

manage co-morbidity. The center of gravity of health care has been moving for sometime from the hospital and doctor's office to the home and the individual. Work being done across MIT, other universities and industry laboratories are making the idea of a check-up-a-day a reality for the chronically ill. As this Committee has heard in previous hearings, many agencies and private insurers are providing monitoring services to support older people with congestive heart failure, diabetes, asthma and now obesity. The innovation here is less the technology, but how these devices are changing the array of service providers we can look to for innovation in technology and service delivery. In Japan, we see Tokyo Electric Power in partnership with Matsushita to provide monitoring services to older adults in metropolitan Tokyo. Here in the United States, as recently presented at the Center for Aging Services Technologies (CAST) event here on Capitol Hill, we are seeing how the local cable provider, in this example – Comcast, and a device manufacturer, Philips, have teamed up to bring both health monitoring and personalized health content to the home. In each of these examples, the innovation is more than the functionality of the communications hardware, it is the creative exploitation of the technology to introduce new players to aging services and bring real value to the homes of older people.

Intelligent Transportation Systems – Although frequently overlooked until it is not available, transportation is an area where technology is beginning to improve both the safety and mobility of an aging society. Although we typically define transport as getting from point A to point B, that is an over simplification. Recalling Sarah Knauss and her ability to “do things” as part of her happiness; transportation is the glue that allows us to access all those great and little things that together are life.

Personally and politically, the capacity to drive a car is freedom, independence and the very identity of the vast majority of older Americans. Those that are no longer comfortable or able to drive show a marked decline in emotional, mental as well as physical wellbeing. Although most older drivers are safe drivers, and most choose to “self-regulate,” that is limit their driving at night, busy periods, poor weather, this is a public safety success and personal tragedy at the same time. For most, limited driving is limited life. Choosing not to go out for one reason or another is a self-imposed limit on life activities, visiting a friend, seeing a grandchild or simply going out for a cup of coffee. To keep an older society healthy and well we must keep it on the move.

In partnership with The Hartford Financial Services Company, and the US Department of Transportation's University Transportation Centers Program, the MIT AgeLab has been conducting behavioral, policy and technology research to make the car safer and extend the safe driving life of older drivers and envision other technologies that make alternatives to the car more acceptable.

Many of the technologies that are moving to the car include warning systems to advise on a possible collision or proximity of another vehicle or object. Other

devices seek to improve night vision a problem that begins far earlier than most of us would like to admit. Working with these systems and others in our lab's simulator, Miss Daisy, we have found that these "intelligent" systems while offering great promise also present a challenge to the older driver.

Introducing new technologies to the car fundamentally changes the driver's understanding (often built up around several decades of experience) of how the car works and in some cases may attempt not to assist but to substitute for the driver's own judgment. Technology is not always 100 percent accurate. An in-vehicle warning is not a substitute for looking. Most of the technologies being introduced into the car offer particular benefits to the older driver, but tax the memory, capacity and judgment of drivers of all ages. Considerable research to understand the Janus-face of technology and its role on older adults in the car as well as other environments must be conducted.

A smarter car will help many drivers older and younger. However, new technologies and design must increasingly focus on the safety of the older driver and passenger. While some indicate that the high fatality rate of drivers over 70-75 is an indication of operator performance, it is far more likely to be due to frailty. Ensuring that the car is able to move us, as well as keep us safe, from childhood through adulthood remains one of the greatest technical and policy challenges facing industry and government.

Other research includes the use of technology to improve the range of alternatives to driving. Nearly 70 percent of older adults live beyond where transit serves well or at all. Para-transit costs an estimated \$7 to \$50 per ride to provide, taxing many other public programs to fund, and provides far less than optimal transportation. New technology to address everything from vehicle design to dispatching and scheduling may increase the responsiveness of these services while managing their costs.

Technology and Aging: The Policy Challenge

The technologies presented today and in other venues capture the imagination and offer the promise of extending Sarah Knauss' experience to the rest of us – enabling us to have our health and to do things. While it is tempting to continue with other examples of devices that are only symbols technology's potential to improve the lives of countless older people, it is my firm belief that the true innovation, and that the true challenge of leveraging technology for an aging society is not a technological problem alone, but it is our ability as researchers, governments and business to rapidly move these ideas from laboratories to living rooms. This requires the development and sustained support of a national infrastructure that supports research and education, creates markets and facilitates partnerships.

Research and Education

Pieces of this infrastructure are already in place. The work being done across the Federal Government including the Roybal Centers, individual NIA grants, the US Department of Education's Rehabilitation Engineering Research Centers, the US Department of Transportation's University Transportation Centers Program and others all support research that helps develop new technologies to support older people and caregivers. In addition to continuing support of these activities that are the seed corn of innovation, greater emphasis should be placed on how technology developers can ensure that the existing system of aging services can take full advantage of the technologies being developed. These services include home care providers, area agencies on aging, community centers, transit providers, publicly-funded social workers and geriatric case managers among others. Additional resources should be made available to improve the outreach by university and industry researchers to these stakeholders to improve and change how services are delivered as well as to learn from the field the true requirements.

In addition to research, technology education remains the "property" of technologists in universities. As a result, innovation is often stalled when commercialized or put in the field, failing to prove its efficacy or return on investment. Sometimes this is because of poor technology; however, increasingly it may be because there has not been an adequate investment in the technology literacy of those caring for an aging society. Overcoming this change management problem is critical to realizing the nation's investment in technology and need to find effective ways to address the demands of older people and caregivers.

Technology education programs, particularly in information technology, should be developed and become a mainstay of the many professions that provide care. These include physicians who are unsure how telemedicine fits into their practice, nurses who were not trained to use technology in the field, case managers, gerontologists and social workers that are high-touch but low-tech, unaware of how they could enhance their care with the right technology.

Create Markets

The Federal Government's greatest power is to set the agenda and to create an environment that influences both public attention and the allocation of resources personal, private and public. Unlike other policy areas, aging does not have the advantage of trigger events that galvanize public attention, industry focus and government purpose. Slow demographic change, while dramatic in impact, does not readily capture attention. There is a wealth of technology available today that could benefit older adults and their caregivers as well as reduce cost of service delivery in the public sector.

Government agencies do not often see how technology may fundamentally change their programs and instead focus on incremental improvements. Excluding a few leaders, industry is slow to see the aging population as an opportunity and not as a cost. Individuals and families fail to see how they need to plan for their parents AND their own aging.

In addition to recent changes in healthcare financing, the Federal Government should actively seek ways to create markets that stimulate more research, commercialization and would pay for innovative technologies and services. This would include research & development tax incentives to firms seeking to leverage their expertise to develop novel devices and services for older adults and caregiving. Tax credits to incent companies who develop eldercare services and benefits programs. To leverage the growing investment of consumer out-of-pocket expenditures in health and other areas, consideration should be given to develop incentives for families who invest in technologies and services in their home or the home of their parents.

Facilitate Partnerships

New technology often means new stakeholders. Envisioning the local utility company as a provider of health, education or simply emergency services to the home will require support from all levels of government. Encouraging private firms to take the risk in a new market with a new, albeit older, population will require government agencies at all levels to think differently about who is in the business of aging. Likewise, additional support for thought leaders in state, regional and local jurisdictions to team with industry to create new approaches to delivery and care should be provided and showcased for others across the country. For example, envisioning how the local grocery store may be seen as an outlet of nutrition services as well as a commercial enterprise may leverage both their easy access and economy of scale in a way that no public agency could provide alone. In short, partnerships between researchers, educators, service delivery agencies, business and government should be encouraged to stimulate a process of innovation that support an improved quality of life for older adults and caregivers.

The Senate Special Committee on Aging is to be commended for placing the issue of technology and aging on the government agenda. Creatively exploiting technology to live better as well as living longer is the aging policy challenge for the next 100 years. This Committee in recent years has sought to understand and promote both the promise and potential of technology in an aging society. Mr. Chairman, your efforts in telemedicine in your home state of Idaho are particularly noteworthy. Likewise, Senator Breaux has invested considerable energy in highlighting technology's role in older people's lives. Thank you for the opportunity to testify today. I would be pleased to answer questions.