THE NATIONAL ACADEMIES

MEETING SUMMARY

CHALLENGES AND OPPORTUNITIES OF AN AGING POPULATION

Government-University-Industry Research Roundtable

February 28-29, 2012
By Mark Bernstein

Extended life expectancies since World War II, the baby boom bulge in retirements, and the fall in fertility rates are creating a society that is rapidly aging. According to common estimates, by 2035, one in five Americans will be age 65 or older. The implications of this trend are enormous: How does a society with a relatively smaller base of workers provide humanely for the pension and health care needs of an expanding elderly population? But this same phenomenon carries with it expanded opportunities – opportunities from extended years of meaningful living and working, as well as opportunities for new kinds of interactions between the generations. What is certain is fundamental change, which was discussed by the experts brought together by this GUIRR meeting.

The February 28 keynote speaker, **Dr. Ken Dychtwald**, spoke on "The Age Wave: Triumph or Tragedy? Four Critical Course Corrections Needed for a Century of Successful Aging." A psychologist, gerontologist and entrepreneur, Dr. Dychtwald is the author of fifteen books on age-related issues. He said he has spent thirty-nine years attempting to understand how human aging would affect families, the economy and individuals. He noted that U.S. life expectancy has increased from 74 years in 2000 to 78 years today. In earlier times, people didn't age, they simply died – which meant that there was no need to learn how to treat diseases associated with aging, he said. Underscoring the new possibilities, Dr. Dychtwald quoted astronaut John Glenn's response to a reporter asking why he, at 77, wished to return to space. Glenn said: "Just because I'm 77 doesn't mean I don't still have dreams." Dreams, Dr. Dychtwald said, are no longer the province of the young.

While aging leads to increased chronic and degenerative ailments, "We have not constructed a medical system for this circumstance," he said; there is insufficient expertise in geriatric care and continuation of care. Aging persons prefer being cared for at home, but new technologies are needed to support this. He noted that individuals report their biggest fear as Alzheimer's disease; past age 85, the rate of dementia is 47 percent. Dr. Dychtwald noted that persons over age 65 have resources, with an average net worth of $250,000. This, he said, could be converted into opportunities in education, culture, travel and elsewhere. New housing designs and different financial services are needed by the aging. He has, he said, spent "sleepless nights thinking about the entrepreneurial possibilities." Dr. Dychtwald then identified his four "course corrections":

1. Re-set the markers of aging.
2. Promote lifelong learning, productivity and social contribution.
3. Foster healthy aging.
4. Reframe the economic infrastructure of the 21st century.

When an audience member asked if politicians were receptive to addressing aging concerns, Dr. Dychtwald responded that if one defined the "Age Wave" as among history's great triumphs, people were receptive. If, however, one spoke of curtailing benefits, political leadership avoided the issue, as older persons are likeliest to vote. An audience member referred to the statistic about seniors' average assets being $250,000; this may be the mean, the audience member said, but many people anticipate little retirement funding other than Social Security. Dr. Dychtwald said that since the mid-20th century, poverty among the elderly has dropped from 33 to 10.5 percent. Still, pockets of poverty remain – particularly with women over age 75 who live alone. An audience member asked if the "Age Wave" favored any nation[s] in global economic competition. Dr. Dychtwald said no European nation has a birth rate sufficient to maintain its current population, positioning them to become older and less competitive. When a questioner asked about health care costs, Dr. Dychtwald explained that he believes health could be improved at lower costs by improving doctors' understanding of geriatric needs; raising personal standards for health [e.g. reducing obesity]; creating a continuum of care; providing more care at home; and constructing "a model of death" based on what people actually want.

GUIRR co-chair Dr. C. D. (Dan) Mote, Jr. opened the February 29 session by calling attention to the "unrelenting transformation" toward a "graying world." He noted the experts present for the day; welcomed GUIRR council members and acknowledged new members and guests. **Susan Sauer Sloan**, GUIRR director, thanked outgoing co-chair **Dr. Lydia Waters Thomas** for her six and one-half years service, and welcomed **Dr. Uma Chowdhry**, formerly chief scientist and chief technologist at DuPont, as the new co-chair.

Opening speaker **Dr. Joseph F. Coughlin,** director of the Age Lab at the Massachusetts Institute of Technology, spoke on "A New Look at Old Age." The issue is global, he said: the over-65 population of China will grow from 165 million today to 400 million by 2050. In 20 years, the United States will be "a nation of Floridas." There is, however, a different perspective, he noted, quoting a 119-year old woman who said she enjoyed life because "I have my health and I can do things." The central issue is not aging but vitality, Dr. Coughlin said. He identified three areas of needed change:

1. Individual behavior: For example, how long should people work? When should schooling occur?
2. New definitions: Robotics are widely used, though not as yet to support aging. Physical infrastructure (e.g. sidewalks and house design) needs adaptation.
3. Support for "aging in place" – that is, providing support and modifications that let elderly people stay in their homes.

Dr. Coughlin anticipated that many in their 50s will return to school and many will work until age 70 (perhaps with robots aiding their work). The elderly, he said, have great concern with mobility. One survey revealed their greatest fear was being diagnosed with a fatal disease; their second greatest fear was losing their driver's license; and their third greatest fear was to have their spouse diagnosed with a fatal disease. The automobile, he said, needs to be reengineered so that it can correct for driver errors in real time.

Dr. Coughlin noted that people commonly define "old" as whatever age they are, plus 15 to 20 years. He considers 45 to be old in the sense that such an individual is probably engaged in care giving with a parent and likely has sufficient time and money to be able to undertake lifestyle changes in anticipation of old age. He discussed motivations to improve the health of the aging. One example was a picture of a grandchild's pet; through use of technology, the pet would appear to sicken and die if the proper health steps were not taken. He noted another example of technology to accommodate aging -- an experimental toilet in Great Britain that analyzed feces content to determine what foods were being missed, and then electronically placed an order for their delivery. Dr. Coughlin presented six recommendations:

1. Form interagency corporate advisory committees
2. Identify new technologies across departments that may push innovation into the older marketplace
3. Implement demonstration public-private partnerships (PPPs) to deliver "nextgen" services that extend beyond health
4. Catalyze an agenda for the investment community
5. Require federally-funded technology licensing to include professional development and education
6. Provide tax incentives for mid-life education, home modification, and care giving.

Dr. Coughlin said the new American dream for longevity would engage policy entrepreneurs in determining how the thirty to fifty years their grandparents did not have could be spent. When a questioner expressed surprise that Dr. Coughlin had not mentioned "community," he responded that community may be required, but that "We have spent 65 years running away from affinity groups."

Aging is a subject with many mistaken assumptions. That theme was developed by **Dr. John W. Rowe**, a professor in the Department of Health Policy and Management at the Mailman School of Public Health, Columbia University, in an address titled "Myths and Realities Regarding the Aging of America." His central point was that existing American institutions were not designed to support the aging population. Policymakers, he added, have been an impediment to progress as their beliefs were inconsistent with reality. He identified the following "myths" and realities:

1. The "baby boom" is a transient phenomenon. In fact, falling fertility rates ensure an aging population.
2. To be old is to be sick. In reality, disability rates have declined.
3. The key age group in an aging society is the elderly. In truth, the young to middle-aged also play lead roles.
4. Intergenerational political warfare is inevitable in an aging society. In fact, neither the U.S. nor Europe offer evidence of this.
5. Policy makers must choose between investments in youth or in the elderly. Rather, policies can be beneficial to multiple age groups.
6. The principal problems of an aging society relate to Social Security and Medicare. Instead, the focus should be on changing the anticipated life course of education, work, and then leisure.
7. The "problem" of aging can be addressed through increased immigration. In fact, such a "solution" would require a five-fold increase in immigration.
8. Older workers must retire to make room for younger workers. This falsely assumes there is a given "lump of labor" without new job creation.

Dr. Richard Suzman spoke on "The NIA and the Challenge of Aging Populations." Dr. Suzman is director of the Behavioral and Social Research Program at the National Institute on Aging (NIA) of the National Institutes of Health. The aging trend is universal and occurring most rapidly in the Third World, he said, adding that aging and population decline are happening simultaneously due to declining fertility. As a benchmark, he reported that in the U.S. 55-year olds would soon outnumber 5-year olds. Many countries underestimate future life expectancy, Dr. Suzman said; longevity has been increasing by three years per decade. The U.S. has been lagging in increased life expectancy since the 1980s – a shortfall he attributed in part to the high proportion of American women who smoke and to obesity.

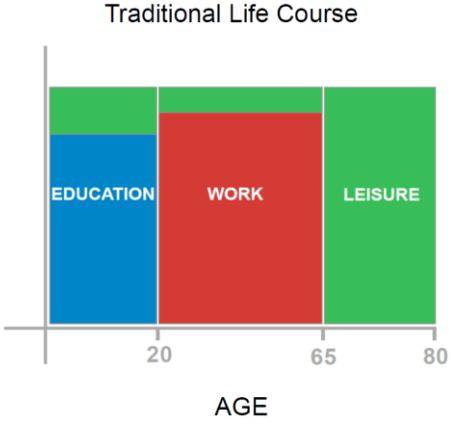
Dr. Suzman has identified trends in late-life health, noting that between 2000 and 2004, unexpected progress had reduced degenerative diseases in persons over 65; as a consequence, 2.5 million fewer Americans than anticipated became disabled. However, the incidence of dementia is "frightening" – the Alzheimer's Association predicts that treatment costs will exceed $1 trillion by 2050. These costs could be cut in half if disease onset were delayed by five years, Dr. Suzman said. Currently, in high-income countries, chronic diseases account for 85 percent of costs, versus 44 percent in other nations, he noted. However, by 2030 chronic disease costs will dominate all regions, including Africa. Americans are by various measures less healthy than Britons, who are themselves less healthy than Europeans. He noted that early retirement leads to a greater cognitive drop. This, he said, could be reversed: cognitive training decreased motor vehicle collisions among older drivers. He noted with approval an intervention in Baltimore that placed African-American women working in schools -- a step that appeared to improve their well-being and health.

An audience member asked if Alzheimer's disease is more prevalent today. Dr. Suzman said that it is not known; incidence does go up with age, but aggregate data is uncertain. Cardiovascular diseases and diabetes might increase the incidence of Alzheimer's disease, he suggested. An audience member noted that, relative to Europe, the U.S. has a higher income disparity. Did lesser health outcomes cut across the disparity? Dr. Suzman noted that a low-income individual in Scotland is healthier than a high-income American.

Dr. Richard Jackson, director and senior fellow at the Global Aging Initiative of the Center for Strategic and International Studies spoke next on "The U.S. Aging Challenge in International Perspective." Jackson said the U.S. has significant advantages in an aging world: Its median age is 37, while in Western Europe the median age is 42, and in Japan it is 45. Further, the U.S. has high fertility and immigration rates, flexible labor markets, and an entrepreneurial culture. By the 2020s, the U.S. will be the only major developed nation with both a growing workforce and a growing population, he said. However, the U.S. is handicapped by a low national savings rate, a dependence on foreign capital, an expensive health care system, and a political system that finds it difficult to grapple with resource trade-offs.

Dr. Jackson identified four challenges:

1. The fiscal challenge: "Graying means paying." Federal retirement and health benefits to the elderly are on track to nearly double as a share of GDP as boomers retire. While the U.S. has more "tax room" than most developed countries, the huge recent run-up in its public debt has pre-committed much of its potential future revenue to debt service. Reducing the cost of old age entitlements is essential, but is likely to face resistance from an aging electorate, a third of which will be age 65 or older by the 2030s. The alternatives are to cannibalize the rest of the budget or run larger deficits.
2. The economic growth challenge: Even as the fiscal burden rises, slowing growth in the working-age population will translate into slowing economic growth. Productivity and living standard growth may also lag due to declining savings and investment rates and the rising average age of the workforce.
3. The social mood challenge: An older society will be more risk averse, as the time horizon to reap the gain or recover from the loss shortens. Domestically, it may be more prone to protect current consumption claims at the expense of investment in the future; internationally, it may be more likely to favor *ad hoc* settlements over decisive engagement.
4. The geopolitical challenge: The developed world will have a shrinking share of the global population and of global GDP. The U.S. share of GDP may drop from 34 percent today to 24 percent in 2050; the "G6" may drop from 38 percent to 14 percent.



Dr. Jackson offered the following suggestions for addressing these challenges:

1. Put the federal budget on a sustainable trajectory.
2. Rethink age-related entitlements.
3. Acknowledge limits in healthcare spending.
4. Reorient the economy from consumption to savings.
5. Raise the retirement age; extend work life; maximize the productiveness of the elderly.
6. Resist protectionist pressure.
7. Accept that the security burden of the world will rest on the U.S.; in terms of demographics and economics, Japan and EU have peaked.

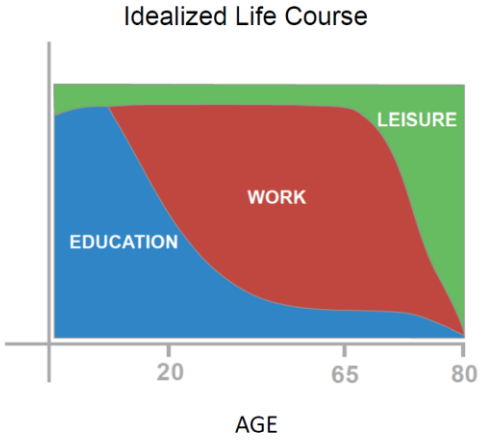
Next, **Dr. R. Paul Crawford** spoke on "Spurring Advancements in Senior Independent Living: Engineering a New Research Infrastructure." Dr. Crawford is a Research Scientist at Intel Labs and Co-Principal Investigator for the Senior Independent Living Research (SILvR) Network Initiative. Dr. Crawford believes that the design of future microprocessor systems requires better understanding of people. Beginning in the 1990s, he said, studies have been done of 1000 homes, 250 health care facilities, and 25 countries. He identified four "broad Intel perspectives."

1. A shift "left" -- from acute care, to residential care, to home care -- would promote less expensive technologies.
2. Support caregiver networks. Families are now investing $375 billion in in-kind care.
3. Develop behavioral markers. Some things, like smoking, are easy to track; others, like diet, are not. New diagnostic tools are needed for "behavior, not just biology."
4. Grow the R&D Ecosystem. A groundswell of approaches is needed.

He noted that some exciting platforms are being created, such as ORCATECH, a system that records when doors are opened, drugs taken, meals eaten, conversations engaged in, etc. He described a project called "A Day in the Life of Gladys" that recorded a woman's phone calls, medications, meals, visits, sleep, and other aspects, with the data reported by unobtrusive technologies located in her home. Dr. Crawford identified other ingredients for success: a holistic approach that involves others; accelerated progress in science; and cost effectiveness. He believes technology and solutions should be "agnostic," representing a multiplicity of approaches.

An audience member suggested that a policy space exists between Dr. Crawford's presentations and those that preceded him: While there was discussion of what new modes would allow people to remain in the labor force, such people might not wish to work. The questioner noted that in the past 40 years women who had entered the workforce were largely still responsible for family creation; this, they said, had not been managed very well. How were meaningful jobs to be created? Dr. Crawford responded that this was not his field; he believes the starting point is the home and making it possible for people to remain there.

The event's speakers gathered for a general discussion. Dr. C. D. Mote, GUIRR co-chair – noting the variety of proposals put forward – asked whose task it is to implement them. Multiple panelists agreed that White House conferences on aging had not been effective. Dr. Richard Jackson said a profound shift is needed across the society; looking for answers within the Beltway is unlikely to prove productive. What is required is a culture shift. Dr. Ken Dychtwald expressed doubt that any particular group had the capacity to effect great change, and said that he is struck by the mass media's disinterest in persons over 55. He believes some of the solutions will come from a 24-year old graduate student who "heard something," connected it to his grandmother, and achieves a breakthrough.



Dr. Richard Suzman said public education is crucial; second, he believes innovations will occur as millions of people respond to necessity. He said the "boomer" generation is rethinking family

ties; multigenerational living is increasing. Sometimes, public policy needs to reinforce; sometimes, it needs to get out of the way. One panelist emphasized the need for further medical research and that the best way to reduce Alzheimer's is to increase research funding. Dr. C.D. Mote asked whether a challenge – such as, President Kennedy's call to go to the Moon – is needed. Dr. Coughlin said he thinks a decentralized model is better; like the environmental or women's movement. Mote said he sees no such movement at present.

Dr. Dychtwald noted that Christopher Plummer just won the Academic Award at age 82, Rupert Murdoch is not "leaving the game," and 250,000 people took part in the Senior Olympics. The question, he said, is how this movement gets groomed and organized. An audience member noted that present federal policy is organized around poverty and health; he doubts federal agencies will change their behavior. Another audience member said one issue for aging has been the youth culture and the lack of intergenerational culture, and that institutions across government can do much more to encourage the latter. Second, the working generation needs more time to engage with people who work less; this would create conditions where people can invest in their community and their parents.

Over lunch, **Dr. Michael Hodin** spoke on "Putting Aging Populations at the Center of the 21st Century Global Agenda." Dr. Hodin is executive director of the Global Coalition on Aging and an adjunct senior fellow at the Council on Foreign Relations. He called attention to one comment; namely, that the cost of doing nothing would be a "train wreck." Responsibility, he added, has to be taken on the individual level. Second, he thought defining "aging" was itself a great challenge. How do we restructure this truly important transformation? Third, he called attention to a placard that showed an older woman's hands on a cane. This, he said, is not a 21st century of model of retirement.

The general need is to get aging populations on the global agenda, Dr. Hodin said. He noted that any global meeting held today includes the environment in the subtext; this was not the case 40 years ago and is not yet the case for aging, though it is being featured in some ways. He noted that in the think tank world, the "World Demographic and Aging Forum" will bring 2,500 people to Kuala Lumpur, and that the World Health Organization is emphasizing aging this year. Dr. Hodin said that in the past 20 years, AIDs has gone from a "death sentence" to a manageable illness, a change that resulted from the focus placed on the problem; Alzheimer's needs similar attention. It is the right thing to do, he said: The data is compelling, and it is in one's own self interest, in term of fiscal sustainability, the 21st century race for competitiveness, and market opportunities. The difficulty with the inherited 20th century model, he said, is that the approach needed cannot simply be about caring but about social and economic change. He identified obsolete policies: Long-term health care cannot simply be about preventing and curing disease; education needs a "life course" approach to learning; work and retirement need to give way to innovative elements for active aging – not retirement but a Second Act.

Dr. Hodin showed several headlines that suggested the approach he had in mind:

> *The New York Times:* "In a graying population, business opportunity"
> *U.S. News and World Report*: "Baby Boomers keep learning with continuing education classes"
> *The Fiscal Times:* "How Aging is Becoming (Surprise!) Sexy"

He sees the need for a global platform that will allow all to prosper and believes that the U.S. has a competitive advantage. He cited changes that are necessary for progress, including adaptation of attitudes and behavior; a commitment to improvements that kept people healthy longer; support for new ways to work differently and longer; and advocacy for new institutional structures for 21st century realities. Programs created for the 19th and 20th centuries must be adapted to ensure fiscal sustainability, he said. A questioner suggested that many families might contain two generations of elderly; it was important not to underemphasize what these elderly people can accomplish. An audience member commented that to stabilize across cultures the ratio of workers to retirees across developed nations would require raising the retirement ages by seven years in the U.S. and 11 years in Japan over the next 30 years. A second audience member noted that this suggests retirement age is fixed, whereas many people desire partial retirement.

The final presenter, **Dr. Maja Mataric**, spoke on "One Robot per Person: Socially Assistive Robotics for Affordably Supporting Aging-in-Place and Improving Quality of Life." Dr. Mataric is a professor of computer science at the University of Southern California. She opened by noting certain "guiding facts": The world's aging population is soaring; the years added to the U.S. lifespan are often not healthy ones; and there have been major increases in obesity, stroke, and Alzheimer's. Further, institutionalizing people often leads to depression and shortened life expectancy. Aging in place, she noted, requires monitoring to ensure adherence to health regimens. Physical fitness supports a healthier old age and social engagement reduces depression. The broad goal, Dr. Mataric said, was to create robotics for the home. A national initiative is possible; people in the field organized, wrote a roadmap, and secured $75 million. To become mainstream, however, robots need to be inexpensive, simple, and suited to daily tasks -- not multi-million-dollar machines. The one area of science, technology, engineering and mathematics (STEM) that most excites students is robotics, she added.
Dr. Mataric explained that robots can be created with a personality suitable to a given individual, making them easier to interact with. Robots are more adept at detecting the early signs of decline – for example, they can tell when someone is losing their balance for the first time and can intervene prior to a fall. She talked about the need for appropriate technologies: "The world is full of 'Thigh Masters' that were purchased and put in closets." She recommended an article from the November 2009 issue of *The New Yorker*, titled "Robots that Care," which was included in the meeting materials provided to participants.

Dr. Mataric noted that elderly users respond to robots – they smile, pet and hug them – leading to reduced stress and increased socialization. A social robot, she said, is a companion that provides monitoring, assessment, and cognitive and physical activities that promote healthy aging. Alternative technologies did not prompt affective attachment, she noted.

She spoke of the use of cameras, and reported that the place people were least willing to allow a camera was the bathroom, though it is the likeliest place for a fall to occur. She added that cameras would not and need not be placed everywhere, as the elderly do not want cameras recording their decline. She further noted that no existing machine is able to determine someone's mood by use of a camera. However, achievements from robot usage do include significant increases in exercise and weight loss; extension of autonomy to the robot once the individual believed the robot was competent; and the use of robots in the home for long-term stroke therapy. Dr. Mataric noted that personality plays a key role in convalescence, rehabilitation, and chronic disease management, with extroverted personalities preferring extroverted robots and introverts faring better with introverted robots. She concluded by showing two short videos: in one, a robot led a stroke-victim through a series of exercises; in the other, the victim performed therapy tasks under the robot's supervision.

Planning Committee for the Challenges and Opportunities of an Aging Population: Celia Merzbacher (Chair), Semiconductor Research Corporation; Virginia Meade, Intel Corporation; Barbara Boyle Torrey, National Institute on Aging, National Institutes of Health; Staff: Susan Sauer Sloan, Director, GUIRR.

The summary was reviewed in draft form by Richard Buckius, Purdue University, to ensure that it meets institutional standards for quality and objectivity. The review comments and draft manuscript remain confidential to protect the integrity of the process.

ABOUT GUIRR

GUIRR's formal mission, revised in 1995, is "to convene senior-most representatives from government, universities, and industry to define and explore critical issues related to the national and global science and technology agenda that are of shared interest; to frame the next critical question stemming from current debate and analysis; and to incubate activities of on-going value to the stakeholders. This forum will be designed to facilitate candid dialogue among participants, to foster self-implementing activities, and, where appropriate, to carry awareness of consequences to the wider public."

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