

DEPARTMENT OF HEALTH AND HUMAN SERVICES
National Institutes of Health
Statement of
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Mr. Chairman and members of the Committee, I am pleased to appear before you today to discuss the ways that biomedical research-by developing treatments and preventive strategies for chronic and disabling diseases - can play a critical role in enabling older persons to remain healthy and active. "Active aging" is a critical issue not only in the United States, but internationally as well. NIA and many international colleagues are committed to developing preventive strategies to delay the onset of chronic and disabling age-associated diseases, as emphasized last year in the G7 Denver Summit communique and reinforced last month at the Birmingham Summit of the Eight. I appreciate this opportunity to discuss current NIA research efforts aimed at the prevention of disability and current and future international collaborative efforts to promote active aging through cross-national research.

When the National Institutes of Health (NIH) was established in 1887, the public health focus was on infectious diseases. The great killers of 1887--cholera, tetanus, typhoid, diphtheria, tuberculosis, pneumonia-are now susceptible to effective albeit imperfect strategies for treatment and prevention, and life expectancy has soared. Today's great killers-heart disease, cancer and stroke- are diseases that can stay with the patient for many years and resist attempts at a cure. Chronic and disabling conditions such as dementia, arthritis, impairment of sight and hearing, and physical frailty may cause years of pain, suffering, and loss of function.

Fueling the rapidly changing demographics of our population are increasing life expectancy and the aging of the babyboomers. With increasing life expectancy comes increasing opportunities for people to fall prey to the "epidemic" of the modern age-chronic and disabling diseases and conditions. The 75 million babyboomers who will turn 65 in the next century are at risk for many years of chronic disability.

The good news is that we are accumulating the tools to treat, delay, or prevent the conditions that interfere with active aging and constitute a terrible burden of pain and suffering. We have built a solid foundation of knowledge about the basic processes underlying disease. Modern approaches to scientific investigation are now revolutionizing our ability to understand how the human body functions at the most fundamental level of the cell and the molecule. We are rapidly expanding our knowledge about the biological, behavioral, and social changes that occur with advancing age. By capitalizing on these new opportunities, we can work to substantially decrease the burden of disease and implement strategies that can maintain physical and cognitive abilities throughout the aging process.

Basic research is providing significant insights into the aging process and associated chronic conditions. For example, major new advances have been made in understanding the role of telomeres (DNA segments on the ends of chromosomes) and telomerase (an enzyme which acts to extend the length of telomeres) in aging and cancer. Most normal cells have little telomerase activity, and these cells lose a portion of their telomeres each time that they divide. When the telomeres have shortened sufficiently, cells stop dividing. Research is now being directed toward understanding whether this limited capacity for cell division is related to the diseases or disability that can accompany aging. In contrast to the behavior of normal cells, most human tumor cells have high levels of telomerase activity-these cells maintain their telomere length and divide endlessly. Many scientists view telomerase inhibition as a potential new approach to cancer therapy.

The excitement of new scientific advances is illustrated in research relevant to several chronic disabling diseases- Alzheimers disease, cardiovascular disease, prostate cancer, osteoporosis and osteoarthritis.

Alzheimer's disease. The National Institute on Aging (NIA) leads an intensive effort to conquer Alzheimer's disease, a progressive brain disorder marked by an irreversible decline in intellectual abilities and by changes in behavior and personality. The long clinical course of Alzheimer's disease strikes as many as four million Americans, with devastating effects to patients, their families, caregivers, and society. Because the prevalence of Alzheimer's disease doubles every five years beyond age 65, the rapid growth of the oldest old population (ages 85 and over) is expected to place a significantly greater number of people at risk for the disease. Some scientists have projected a tripling of individuals with Alzheimer's disease to 14 million by the year 2050 if means to delay or prevent its onset are not discovered. While not long ago the symptoms of Alzheimer's disease were referred to as "senility" and assumed to be an usual feature of growing old, research has since shown that these symptoms are not a part of normal aging. In the absence of disease, the human brain functions well throughout life.

Using data from epidemiological studies, we have recently identified three new candidates for interventions -- antioxidants, non-steroidal anti-inflammatory drugs (NSAIDs) such as ibuprofen, and estrogen replacement therapy. Based on the suggestive data of epidemiologic studies, the NIA plans to initiate clinical trials to test the effectiveness of ibuprofen and of estrogen in treatment or prevention of Alzheimer's disease. A recently completed clinical trial showed that the antioxidants selegiline and vitamin E may slow development of functional signs and symptoms of AD by several months, although they did not affect cognitive measures. Research continues on the etiology and prevention of this devastating disease.

Cardiovascular disease. The NIA and the National Heart, Lung and Blood Institute supported a controlled clinical trial, Systolic Hypertension in the Elderly Program (SHEP), to test the effectiveness of low doses of the diuretic chlorthalidone to treat isolated systolic hypertension in older people. Systolic hypertension is a chief risk factor for heart failure, a serious and disabling cardiovascular disease now increasing in prevalence in the U.S. Older people who were treated in the trial had 50% less heart failure than those not treated. For those who had previously had a heart attack, treatment reduced the chance of developing heart failure even more dramatically. Treatment with this relatively inexpensive medication could contribute significantly to preventing disability.

Prostate cancer. Using data from the Baltimore Longitudinal Study of Aging, NIA scientists and colleagues have produced several important advances about the role of prostate specific antigen (PSA) in identifying prostate cancer. In the blood, some PSA binds to proteins, and some PSA remains free, or unbound. Examining the ratio of free and bound PSA in the blood not only improves identification of likely cancer, but also may predict whether the cancer will be fast or slow-growing. This can help the physician decide whether to aggressively treat or to monitor the cancer. Avoiding unneeded treatment, such as radiation or surgery, may reduce unfortunate complications, including impotence and incontinence.

Osteoporosis and Osteoarthritis. Loss of bone mass due to osteoporosis reportedly contributes to 1.5 million fractures each year in the U.S. Because hip fractures are so prevalent, identifying risks and interventions can make an enormous impact on preventing disability, particularly in older women who increasingly outnumber men as they age. Some prominent and modifiable factors that have been found to increase the risk of hip fracture are the following: poor visual acuity; more than two cups of coffee a day; no walking for exercise; being on one's feet less than four hours a day; and the dose of some medications such as long-acting benzodiazepines and anticonvulsant drugs. There is strong evidence that nutrition and physical activity interventions can prevent fractures even in older individuals. A clinical trial now confirms that increasing the intake of calcium and vitamin D can improve bone strength among

older subjects and therefore can be an important life-long strategy to reduce disability.

Osteoarthritis, a painful degenerative joint disease, also affects millions of older Americans. A controlled trial conducted at an NIA Older Americans Independence Center demonstrated that walking and resistance exercises can safely improve function and reduce pain in patients with knee osteoarthritis, suggesting that exercise should be considered as part of the treatment for these individuals.

Multifaceted approaches to preventing disability Chronic disability is sometimes caused by a single injury or dispose process, but for many individuals, particularly older persons, disability is the result of multiple, complex, and interacting factors. Teamed with research to prevent and treat specific diseases, new behavioral and clinical strategies are making critical contributions to disability prevention.

Well-documented benefits for health and longevity come as a result of adopting healthy lifestyle practices, such as increased physical activity, improved diet and smoking cessation. Higher levels of physical activity have been associated with decreased risks of coronary heart disease, cerebrovascular disease, hypertension, non-insulin-dependent diabetes mellitus, colon and, possibly, breast cancer. There is a wealth of knowledge about the benefits of good nutrition. Now NIA research is helping to define optimal needs regarding exercise, diet and diet supplements in older persons.

We know that the benefits of terminating smoking accrue at all ages, even to the very old. A large NIA research portfolio is dedicated to finding ways to overcome the impediments that can prevent people from initiating and maintaining behaviors that can extend the healthy years of life.

Complementing NIA's research on health-enhancing behavior are studies of strategies to prevent events that can have devastating effects on older persons. One NIA- study found that experiencing a fall, even a single, non-injurious fall, was linked to an almost five times greater risk of subsequent admission to a nursing facility. As the investigators noted, in addition to being a sign of frailty or disease, falls and the loss of confidence they may instill could precipitate the decision to pursue placement in a nursing home.

An NIA-supported controlled intervention trial showed that falls could be reduced by about 40% among older persons living in the community by preventive strategies, such as adjustments in medications and exercise regimens. These approaches could readily be incorporated into the care of older persons.

Research not only indicates which behaviors, strategies and medications are effective in preventing disease and disability. It also indicates which are not. This becomes particularly important when claims about the efficacy of such things as "anti-aging" regimens and products are widely spread, There is a need to assess the clinical utility of supplements of hormones and hormone-like molecules such as melatonin, DHEA, testosterone, and growth hormones, that tend to decline, on average, with age.

As research leads to interventions to reduce the impact of chronic disease investigators are monitoring the nation's disability rates. Demographic research has shown that at least 1.4 million fewer older persons in the U.S. are disabled than would have been if the disability rates of the elderly had not improved since 1982. We do not fully understand the forces that have contributed to the decline in disability rates or whether these will continue. Internationally, studies in Canada and France also report improvements in the prevalence of disabilities, and survey data from the United Kingdom are currently being analyzed. Further studies will explore the specific underlying causes contributing to the decline and its implications for national policies for the elderly. Recent findings from the National Long Term Care Survey, the Global Burden of Disease report, and additional data sets provide new opportunities for developing internationally comparable data for use in interpreting trends in chronic disability and

mortality.

International Collaboration

This is an exciting time for aging research. International efforts are critical to giving a comprehensive picture of the needs of the elderly population world-wide and to providing clues on how we can best address those needs. International exchange of information and personnel allow for cross-national comparisons of data, unique perspectives, and pooling of resources.

Cross-national research on aging is aided by coordination within the Department of Health and Human Services (DHHS). For example, the DHHS Office of the Assistant Secretary for Planning and Evaluation collaborates with the NIA in planning international aging research. NIA also works with other agencies. The U.S. Bureau of the Census has joined the NIA in supporting the development of an International Database on Aging that is the basis for a cross-national research and publication program on aging populations. Publications supported by this effort include Aging World, Aging in the Third World, Aging World 11 (a new edition is planned for 1999), Older Workers, Retirement and Pensions: A Comparative International Chartbook, and wallcharts on global aging.

The NIA intramural program supports the Honolulu Aging Study, which since 1991 has compared American rates and patterns of cognitive impairment, Alzheimer's disease and vascular dementia with similar data from collaborating population-based studies in Hiroshima, Taiwan, and Seattle. The study provides a special opportunity to examine the impacts of Japanese cultural and genetic factors on etiology of dementia, and to utilize a wealth of prospectively collected information in a search for risk factors.

Similarly, NIA has supported research that investigated the contribution of genetic and life style factors of age-related dementia through cross-national comparisons. One such study is comparing cognitive functions and risk factors in a population of African Americans of Nigerian descent with a population of Nigerians living in Nigeria.

Foreign scientists are encouraged to participate in intramural research conducted at the NIA Gerontology Research Center. Staff of the Fogarty International Center (Fogarty) help make possible these visits, which result in substantial contributions to the Institute's research and provide a dynamic link to labs in other countries. Fogarty is assisting the NIA to develop a program to provide training of aging researchers in developing countries.

Fogarty works with the NIA to encourage international cooperation on the health needs of aging populations. Fogarty staff also serve as policy advisers on most matters of foreign interaction. They are available to broker agreements and to serve as intermediaries with multinational organizations such as the World Health Organization, as well as represent NIH interests to the U.S. State Department.

Directions for Future International Collaboration

Continued collaborative basic and applied biomedical and behavioral research will likely contribute to a better understanding of the aging process, disability trends, more effective prevention strategies and ways to foster less disability at older ages. Cross national research could also shed light on which life styles and public policies contribute most significantly to healthy aging.

At the 1997 Denver Summit of the Eight, leaders of the eight largest industrial nations endorsed collaborative efforts among their governments. The Summit's Final Communique' states "Our

governments will work together, within the OECD and with other international organizations, to promote active aging through information exchanges and cross-national research. We encourage collaborative biomedical and behavioral research to improve active life expectancy and reduce disability, and have directed our officials to identify gaps in our knowledge and explore developing comparable data in our nations to improve our capacity to address the challenges of population aging into the 21st Century."

Thank you for this opportunity to discuss some of the achievements, the challenges, and the promises of aging research. I would be pleased to answer any question you may have.