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# DIET RELATED TO KILLER DISEASES, VII

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## HEARING BEFORE THE SELECT COMMITTEE ON NUTRITION AND HUMAN NEEDS OF THE UNITED STATES SENATE NINETY-FIFTH CONGRESS FIRST SESSION

SEPTEMBER 23, 1977

NUTRITION: AGING AND THE ELDERLY



Printed for the use of the  
Select Committee on Nutrition and Human Needs





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(II)



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## DIET RELATED TO KILLER DISEASES, VII

FRIDAY, SEPTEMBER 23, 1977

U.S. SENATE,  
SELECT COMMITTEE ON  
NUTRITION AND HUMAN NEEDS,  
*Washington, D.C.*

The select committee met at 9:30 a.m., pursuant to notice, in room 457, Russell Senate Office Building, Hon. George McGovern (chairman of the committee) presiding.

Present: Senators McGovern and Kennedy.

### STATEMENT OF HON. GEORGE MCGOVERN, A U.S. SENATOR FROM THE STATE OF SOUTH DAKOTA

Senator MCGOVERN. Good morning. In view of the time constraints we are under with the Senate to consider the energy bill again this morning, we will proceed with the hearing.

Today's hearing focuses on America's older citizens whose health status is very much affected by the diet their parents ate—the diet they ate as children and young adults—and their current dietary practices. We have much to learn about diet as it relates to the aging process and the elderly. To start with: We do not even know what normal aging is. We do not know which changes with age are due to the normal process of aging and which are due to the individual's heredity, cultural setting, and lifestyle. Even though 10 percent of all elderly Americans have some kind of nutrient deficiency, we do not know what the nutrient requirements are for the aged.

On the other hand, we do know: That cancer, stroke, and heart disease—this Nation's major killers—are not the inevitable tolls of aging; that 6 of the 10 leading causes of death are nutrition related, and that their debilitating impact is felt most directly among older Americans; and that a better diet can improve one's health at any stage of the aging process.

The number of Americans over 65 has almost doubled since 1950 from 12 million to 23 million, which represents an increase from 8 percent to 11 percent of the total population. By the year 2000, there will be 30 million elderly Americans.

From 1966 to 1974, expenditures for medical care for the elderly increased threefold, and in 1974 totaled \$27 billion for hospital costs alone.

Whereas a child born today can expect to live at least 71.3 years—23.3 years longer than a child born in 1900—the life expectancy at age 45 has increased only by less than 5 years for men and by less than 10 years for women.



We have asked Dr. Robert Butler, Director of the National Institute on Aging at the National Institutes of Health, who is one of the Nation's leading gerontologists, and has been awarded the Pulitzer Prize for his book on aging, to help us develop a baseline of understanding with respect to nutrition: aging and the elderly.

While we anticipate that the findings of this hearing will generate action both with respect to research and programs, the most important outcome will be to set in motion the rise of a positive consciousness toward, and among, our older citizens.

We have waited too long to reverse the attitude which predominates among all ages in this country that to be old is to be sick—both mentally and physically—sad, tired, dirty, and ugly. As clearly shown by Ken Ringle in the *Washington Post* last Sunday,<sup>1</sup> it is a travesty that—

underlying our national life, in brief, has been the unstated assumption that old people weren't very important, they couldn't cope very well, and while we might owe them something in the way of social care, we didn't owe them much because there weren't very many of them, and anyway they wouldn't be around too long.

In short, it is time that America embraced its elderly as a great national resource. By ignoring our elderly, we have allowed them to deteriorate before our very eyes. Today's hearing should clearly demonstrate that one immediate action, which all of us can take to help stop the deterioration, is to improve our diet in order to enhance the quality of our life.

Senator Kennedy, do you have a statement?

#### **STATEMENT OF HON. EDWARD M. KENNEDY, A U.S. SENATOR FROM THE STATE OF MASSACHUSETTS**

Senator KENNEDY. I am delighted that the committee is holding this hearing on nutrition, aging and the elderly as a continuation of the series on diet related to killer diseases.

In the year 2000, there will be 30 million elderly Americans and we should ask ourselves; what will be the quality of life for these elderly Americans in the final chapters of their lives? Will it be, as it is today, a bitter struggle for survival? Will it be, as it is today, an environment of isolation and feeling of hopelessness? Will it be, as it is today, that those in the majority will continue to ignore and reject a valuable human resource? Will it be that we will not have applied our best educational minds and technological resources to finding solutions to the problems that negatively affect the quality of life for our elderly Americans?

Good nutrition is essential for good health and the elderly are no exception. However, while that statement is widely accepted, we have not significantly begun to determine the nutritional needs of older persons. We have not significantly begun to incorporate nutrition counseling into primary health care nor have we begun to identify nutritionally vulnerable groups in our society.

As chairman of the Senate Health Subcommittee, I am deeply interested in any insight that our panel might share with us on the issue, particularly as it related to our health manpower needs, research,

<sup>1</sup> See p. 109.



health-care cost containment and prevention as well as nutritional education in medical schools.

I am hopeful that today's hearing can assist the Select Committee on Nutrition in making constructive recommendations to the Senate and the American public about ways to enhance the quality of life for the elderly through sound nutritional policies and programs.

Senator McGOVERN. Due to other congressional hearings, Senator Dole is unable to be here this morning, but has requested that his statement be read into the record at this point.

#### **STATEMENT OF HON. ROBERT DOLE, A U.S. SENATOR FROM THE STATE OF KANSAS**

The purpose of today's hearing is to continue the Nutrition Committee's focus on nutrition, and to explore how it affects the elderly and the aging process. We admit that few hard facts are known about human nutrition. There is not even an accepted definition of an "adequate diet." But, beyond that, we know even less about nutrition as it affects older citizens. It is embarrassing that in today's scientific world, we lack such basic knowledge.

Testimony presented to this committee during the past year suggests that 6 of the 10 leading causes of death in America can be affected by diet. In addition, the elderly might be affected even more by diet because of new theories that some disabling diseases, such as senility and osteoporosis, could be controlled by diet modification. The possibility is intriguing and certainly worthy of further research.

As it is now, we are not even sure how to distinguish between aging and disease. Surveys taken among young children reflect a sobering concept of their image of the elderly. Children view this group as being dirty, frail, ugly, and diseased. They seem not to recognize that many older persons are productive, self-sufficient, and happy.

The children's concept is sobering—even shocking, and should make all of us stop to question what we are doing to our older citizens. It is true that the way a society treats its senior citizens reveals the character of that society. Unfortunately, the picture which we see is not very attractive. Like the children, we often stereotype older Americans into roles which they should not have to accept. Unfortunately, they frequently have no other choice. Mandatory retirement, based on chronological rather than functional standards, supports the stereotype that older persons can't work effectively.

Gradually we are coming to learn that the aging process begins well before a person reaches the arbitrary age of 60. It begins in middle age, or during the young adult years. In fact, it begins with the development of a person's character, as a child grows into an individual.

To prepare for old age, we must begin now. I trust that this morning's hearing will give us a better understanding of the aging process, particularly as it is influenced by one's nutritional diet.

Senator McGOVERN. Dr. Butler, the committee is very pleased that you accepted our invitation to be here today. We think you are the person in the country best qualified to speak to these issues. You may proceed in any way you see fit. We welcome you and your associates.



STATEMENT OF DR. ROBERT N. BUTLER, DIRECTOR, NATIONAL INSTITUTE ON AGING; ACCOMPANIED BY DR. RICHARD GREULICH, DIRECTOR, GERONTOLOGY RESEARCH CENTER AND SCIENTIFIC DIRECTOR, NIA; DR. CHARLES H. BARROWS, ACTING CHIEF, LABORATORY OF CELLULAR AND COMPARATIVE PHYSIOLOGY, GERONTOLOGY RESEARCH CENTER; AND DR. DON C. GIBSON, HEALTH SCIENTIST ADMINISTRATOR, EXTRAMURAL AND COLLABORATIVE RESEARCH PROGRAMS, NIA

Dr. BUTLER. Mr. Chairman, I am very pleased to be here. We have a lengthy statement, and I will speak to the highlights.<sup>1</sup>

Before I do, let me say that as a clinician in Washington, D.C., on my rounds I saw much poverty, hunger, and malnutrition among older people in the inner city. I have seen older people give up waiting in long lines for food stamps. But I have also seen affluent older women, living on Connecticut Avenue in Northwest Washington, in grief, depression, and loneliness, eating poorly.

I have seen older people, apparently dazed and disoriented, perk up after admission to a hospital, with just a little tenderness and some hospital food—which, as you know, is not always that inspiring.

There are more people in nursing homes than in hospitals in the United States. Some of these people are probably suffering from poor nutrition, or are in these homes to begin with because of poor nutrition. For example, reversible brain conditions can result from malnutrition and, unless treated in time, often cause the permanent disability that requires long-term care.

We spend about \$4.5 million per year on research on the brain diseases of old age; but we spend \$10 billion per year in nursing home care.

I don't know how to estimate precisely the personal cost and the economic cost to our Nation of our lack of knowledge regarding nutrition and mental function. Nor do I know how to estimate the costs of lifetime habits of poor nutrition. Undoubtedly, though the costs we pay are very high.

My present clinical and scientific judgment is that the dietary goals established by your committee represent a major potential contribution to health maintenance, and are important in the later years as well as at other ages. But I would prefer that this conviction be supported by a still more substantial body of well-established scientific fact, particularly related to older people.

And I am also persuaded that it is never too late to change nutrition in late life.

One example is anemia. Many surveys indicate that up to 25 percent of older people have some degree of anemia. This condition is subject to treatment if diagnosed and is certainly an example of potential cost containment.

Older people must themselves be encouraged to take leadership in self-care, including nutrition. Being old is a convention of time, but the number of years people have after 65 is considerable—for men

<sup>1</sup> Dr. Butler's prepared statement appears on p. 27.



as many as 14 years, for women as many as 17. Surely the quality of these years would be vastly improved by more adequate nutrition.

I greatly appreciate this opportunity to discuss nutrition and aging with persons who share my conviction of the vital importance of proper nutrition to the well-being of the aged population. I am also pleased to be able to share with you the National Institute of Aging's programs and plans for research on nutrition in aging to help us maintain the health of older people.

To assist in our exploring these topics, I have asked Dr. Richard Greulich, Director of NIA's Gerontology Research Center and Scientific Director, NIA; Dr. Charles H. Barrows, Acting Chief of NIA's Laboratory of Cellular and Comparative Physiology at the GRC, on my far right; and Dr. Don C. Gibson, a Health Scientist Administrator in the Extramural and Collaborative Research Programs, NIA, to join me today. All of us are actively involved in developing a comprehensive research program in nutrition and aging for the NIA.

As you know, NIA is a new Institute. We are only beginning our work. We all agree that proper nutrition throughout life, including late life, is an effective means of maintaining good health and minimizing degenerative changes in the later years.

As you have stated many times, nutrition is a cornerstone of preventive medicine. The great reductions in morbidity and mortality that have occurred in this century have been due mainly to the prevention of infectious and nutritional diseases. Curative medicine has undeniably played a major role in health improvements since 1900. Equally undeniable, though, are the enormous effects of preventive measures, such as sanitation, immunization, and the provision of a diet adequate in the required vitamins, minerals, and other food elements. It is only through adequately nutritious diets that old people retain the capacity to remain active and productive. These are only some of the reasons why nutrition research is one of the NIA's highest priorities.

We have much to learn. There is much that we do not know, and we also know much that we do not fully apply.

Our interest, then, is nutrition and health, as well as nutrition and disease.

From a modest initial base of nutrition research inherited from NIA's parent Institute, the National Institute of Child Health and Human Development, the NIA has worked steadily to improve its programs. Since the formation of the NIA in 1974, there has been a fivefold increase in nutrition support through NIA's research grant program. Most of this increase has come from NIA's attracting prominent nutrition scientists to the field. Nutrition research is already deeply imbedded in many programs of the NIA Gerontology Research Center. Let me list some of our efforts.

One: Our grant program recently issued a "Request for Applications on Nutrition and Aging", outlining our priority research interests in this subject. Both Dr. Gibson and I will be discussing this RFA further, including the encouraging response we have received. To date, more than 50 researchers, representing most of the major research centers in the United States, have expressed their interest in submitting a research grant proposal on nutrition research to the NIA within the coming fiscal year. From this and other attempts to stim-



ulate new, high quality research efforts, the Institute's grant support in nutrition research, funds allowing, may double over the coming fiscal year.

Two: Another means NIA is using to catalyze research interest and utilize exceptional research talent in our nutrition planning is to sponsor a working conference for early 1978, not only to expand research interest in the field, but to identify studies which warrant coordination or collaboration with the various NIH Institutes.

Three: The Institute most closely alined with the NIA in research on clinical nutrition is the National Institute of Child Health and Human Development. Dr. Greulich is the principal NIA staff member working with representatives of the NICHD to explore the development of a program for collaboration between the two Institutes on the role of nutrition in sustaining optimal health throughout life.

Four: The National Institutes of Health has identified nutrition as a major issue involving many Institutes. The NIA is an active member of the coordinating committee. NIH has established to improve the nutrition research efforts of the responsible Institutes.

Five: There is as one of our plan options, the possibility of a Center on Nutrition, involving not only the National Institute of Child Health and Human Development and of Aging, but other Institutes as well.

Six: The "Baltimore Longitudinal Study", which is part of our Institute's heritage, is a multidisciplinary study now involving about 650 male volunteers, and it includes an evaluation of nutritional factors in over 1,000 volunteers who participated over nearly 20 years. In January, a large cohort of female relatives of these volunteers will be added to the all-male study, making it one of the first intensive biomedical and behavioral family longitudinal studies in history. Much of the relevant dietary and metabolic data are ripe for analysis as to the role of these controllable variables in the life history of the participants. The addition of female spouses and other family members will permit dietary cross-validation and vital comparison of the differential effects of diet on the two sexes.

It is worth noting that women live on an average of 8 years longer than men. It would be important to understand what the explanatory factors might be.

Seven: Epidemiologic research on the dietary intake and nutritional status of the aged population in the United States has been wholly inadequate. Data from well-designed studies are an essential base for research on nutritional requirements, the impact of nutrition on health, and the management of nutrition programs for the elderly, such as title VII of the Older Americans Act. The NIA has recently selected an outstanding American epidemiologist as its Associate Director for Epidemiology, Demography and Biometry. He will work closely with the National Center for Health Statistics and other appropriate Government agencies to correct the neglect of the aged in research on nutritional status from epidemiological and demographic perspectives.

Eight: To expand our program of clinical nutrition, NIA staff members have been working to make researchers in aging aware of the valuable resources of NIH's 83 general clinical research centers.

Nine: Finally, the NIA has a major responsibility to see that first-rate scientists are trained to study the problems of nutrition and aging.



The NIA hopes to be able to apply every training support mechanism at its disposal to increase the number of researchers in this area. In particular, our extramural and collaborative research program intends to issue an announcement in the "NIH Guide to Grants and Contracts" encouraging the development of research training projects in various aspects of nutrition and aging.

As we go along, we will discuss these major NIA initiatives in greater detail. The overall mission of the NIA is to conduct and support biomedical, social and behavioral research, and research training related to the processes of aging and the diseases and other special problems and needs of the elderly. The NIA research program in nutrition aims to expand the knowledge base on: (1) What constitutes an adequate diet for the older person, focusing on the changes that occur with age in the need for nutrients; (2) what older people eat; (3) the factors that affect eating habits—economic, behavioral, and physiological; (4) changes in the physiology of digestion with age; (5) the assimilation of nutrients into the body tissues in the older person; (6) risk factors for pathology in middle and old age correlated with nutritional status; and (7) topics of special significance, such as the interaction of nutritional variables and drugs.

Determining the normative aspects of nutrition and aging is necessary for refining nutrition service and education programs and for distinguishing between health and disease. In particular, understanding the motivations, disabilities, and misunderstandings which affect eating habits can be exploited to prevent some of the malnutrition that results in costly deterioration in health. Even applying some of the knowledge already available on nutrition could have an important impact on the health of older Americans.

We are all aware that most Americans of all ages eat too many calories, fat, sugars, and salt. Red meat and dairy products make up too large a portion of the average daily diet. Persuasive advertising can strongly affect the perpetuation of such habits. Many people pay for such eating with their lives, but it is essential to note that bad habits can be changed in late life and can have a positive effect.

There are a number of studies that show, for instance, that stopping tobacco smoking even in a group of people with a mean age of 71 years can lead to a reversal in adverse pulmonary findings.

However, changing the diet and related habits of the U.S. population involve massive cultural and educational transformations. Effecting the needed changes identified through research requires such major initiatives as improved programs of mass education—involving public schools, health providers, and the media; improved nutrition education of health professionals; and more complete disclosure of food content, as through adequate labeling of packaged foods. These efforts are far beyond the areas of expertise or mandate of the NIH, but every effort will be made to effectively transfer new knowledge obtained through research to such programs.

Not the least of these benefits is health cost containment. I have made available with the testimony these demographic charts that show 17 percent of the American population will be over 65 years of age by the year 2030. In only 50 years, older persons may make up one-fifth of the population. In 1976, the old made up approximately 10.5 percent



of the American population. Yet, 54 cents of every health care dollar was spent on their medical care. This explosion in the absolute numbers and relative proportion of older people demands that full attention be paid to research on ways to prevent further disease and disability.

I have referred to our "Baltimore Longitudinal Study" and its heavy emphasis on nutrition. I have pointed out that dietary information is obtained from the subjects of this study, all volunteers, using a 1-week diary technique. Computer technology permits the conversion of this type of information into detailed nutritional data on intake of calories, proteins, fats, and carbohydrates; specific types of fatty acid and carbohydrates ingested; and vitamin and mineral consumption. Measurements of obesity, glucose tolerance, and cardiac status are also available for analysis. The subjects are highly educated and provide detailed and reliable dietary information. They are also unique in that they range in age from the earliest to the latest adult years of life. Furthermore, since the same individuals are studied repeatedly, the effect of aging on dietary habits and the impact of secular influences on nutritional preferences can be tracked. The addition of female volunteers, mentioned earlier, will complement this analysis.

Long-term differences in nutritional patterns among individuals can be correlated with various outcomes. For example, the longitudinal study is investigating whether those individuals who retain good health, both physically and intellectually, share certain nutritional characteristics which differ from those of individuals who age poorly. The study seeks to determine whether there are recognizable nutritional precursors to some of the common diseases of the elderly—diabetes, dementia, osteoporosis, obesity, et cetera. The intensive study of each individual will make it possible to assess the effects of nutrition on the rate of decline in function in a variety of organ systems.

In addition to research associated with the longitudinal study, the GRC conducts research on the relationship between nutrition and longevity. As a first approach to this research objective, studies have related the biochemical characteristics of the tissues of animals subjected to several dietary regimens known to increase life span to longevity. The optimum protein intake in animals with respect to longevity is not clear. We do know, however, that the animals subjected to certain restrictive regimens do pay a high price in terms of changes in their reproductive and intellectual capacity.

Because of an inadequate knowledge base, recommended dietary allowances for the elderly are based principally on extrapolations from data available from younger adults. As a person ages, his or her need for calories decreases. While we recognize the need for additional knowledge, some evidence has shown that the need for protein is at least as great in the elderly as in younger age groups. At the same time, the healthy older person's need for nutrients does not appear to decrease.

However, the effects of chronic disease upon the absorption and utilization of ingested nutrients is not well understood. Various diseases may, for example, decrease the absorption of vitamins in the aged and thereby increase their minimum requirements.

Aspects of nutrition besides the provision of nutrients must also be considered. Sufficient roughage must be included in the diet, and sufficient water must be consumed to preserve bowel regularity. Recent



evidence suggests that roughage may be useful in reducing the risk of diverticulitis and cancer of the large bowel.

The NIA is in the process of an intensive planning effort to identify specific areas in which additional clinical and basic research is needed, particularly in the areas of age-related dietary requirements for vitamins, trace minerals, fats, carbohydrates, and proteins. Studies must also be conducted relating to sensory perception as, for example, taste and smell. An older person may sprinkle too much salt on his food because he does not have the same effective acuity of taste.

The aged person is a major user of therapeutic drugs. There is evidence that, like variations in nutritional needs, drug responses in the elderly are different from those of young adults. It can reasonably be assumed that interactions of drugs and nutrition have special relevance for the elderly. For example, deficiencies in fat-soluble vitamins such as A, D, and E in the aged are frequently due to interference in absorption caused by the habitual use of the common laxative mineral oil, which drains away fat-soluble vitamins.

In addition, various drugs used in the treatment of chronic diseases are known to interfere with the absorption or utilization of specific nutrients, including vitamin B<sub>12</sub> and folic acid. The possible synergistic effect of a borderline nutrient intake with prolonged drug therapy in the older person may also be a fruitful area of investigation.

A rational basis for determining nutritional requirements for the elderly, however, can only be developed if we understand how nutrient metabolism changes with age. Diet alone does not determine nutrition. Patterns of movements of nutrients through the intestinal tract, for example, partially determine how much of a given food substance, once ingested, is made available to replace worn tissue or fuel activity.

There is a vast lack of information on the nutritional adequacy of the diet of elderly individuals. Nutritional status studies such as the "Ten-State Nutrition Survey" have shown that many older persons have health problems stemming from nutritional deficits. U.S. hospital and nursing home admission data indicate that nutritional deficiencies run as high as 10 percent. The principal Federal food consumption studies, including those of the U.S. Department of Agriculture and the "Health and Nutrition Examination Survey" of the National Center for Health Statistics, confirm that the diets of older Americans are often below standard, both in quantity and quality.

But it is important to note the "Health and Nutrition Examination Survey" has data up to age 74 only. Another serious shortcoming is that those most likely to be malnourished are seldom included in such surveys, either because they are unable to respond to the survey procedures or because they are in institutions.

A large proportion of those who survive to middle and old age suffer from such chronic diseases as atherosclerosis, hypertension, cancer, osteoporosis, diabetes, and senile dementia. The significant role of diet as a factor in the emergence of these diseases has been well documented.

Osteoporosis is of particular interest to us. It is the disease that is characterized by softening of bones which then become weak and porous and often lead to the kind of fractures of hips that are the beginning of admission to nursing home care. Approximately 25 to 30 percent of women and 15 to 20 percent of men over the age of 50 have osteoporosis severe enough to involve vertebral compression.



Dr. Donald Whedon, Director of the National Institute of Arthritis, Metabolism, and Digestive Diseases, has stated that among the most important measures for preventing osteoporosis are a sufficient calcium intake, a diet adequate in protein and other nutrients, and possible treatment with vitamins or other nutritional supplements, but obviously, we need more research.

Distinguishing between normal and abnormal alterations in carbohydrate metabolism associated with age, obesity, and diet will provide the basis for understanding and treating late-onset diabetes. If one were to go by the findings of the glucose tolerance test, about 50 percent of all normal subjects, as measured in our normal aging study of people over 65, would be considered chemical diabetics but should we be judging by the performance of glucose tolerance tests? Shouldn't we be able to understand better the gray area between disease and age?

One of the major impacts of diet in old age is its effect on cerebral functioning, mood, and behavior. Research on this topic is just beginning, but it holds the promise of important discoveries in the future. For example, malnutrition and associated anemia are two of the primary causes of reversible brain syndromes. Reversible brain syndromes are characterized by fluctuating levels of awareness, which may vary from mild confusion to stupor or active delirium. The patient is typically disoriented, mistaking one person for another, and may have other intellectual functions impaired as well. If they go untreated, they can become chronic and irreversible conditions. If they are treated properly, the person may be returned to a full life. The personal anguish and the costs of unnecessary institutionalization are severe for those whose reversible brain syndromes are not correctly diagnosed and promptly treated.

These plans, the reflections of the energy of a new and young institute, are obviously extensive, and our resources and personnel, on the other hand, are obviously limited.

The current NIA nutrition research program for fiscal year 1977 totals \$1.3 million. Fiscal projections of NIA support for research in clinical nutrition and aging can only be estimated in the broadest possible terms. However, it is anticipated that substantial interest and resulting proposals from the scientific community will be stimulated by both the "Request for Applications" from the scientific community and the planned workshop. Only those proposals received by November of this year will be fundable in fiscal year 1978.

After this initial lag, we should have more and more vigorous acceleration of support as a result of our efforts to communicate our priorities to the scientific community. By fiscal year 1982, our extramural program hopes that it may quadruple its current support of the clinical research on nutrition.

The anticipated interest, however, assumes the existence of a sufficient base of research manpower and a sufficient amount of funds to carry out the expanded research effort.

The development of this base involves serious issues of research training policy and funding. The NIA is not now supporting any manpower development in the area of clinical nutrition and aging through its training grant and research career development mechanisms. Because efforts to intensify support in the field are just beginning, it is difficult to estimate the size of the present manpower pool



equipped to perform the kinds of research we have identified as high priority.

In addition to the impact of research and training for research, improved nutrition for the aged will depend upon the efforts of well-trained nutritionists and other health professionals who are better trained in nutrition and geriatric medicine than is presently the case. With additional training, also, nurses could be much more instrumental in the nutritional education of older people. The NIA is exerting great efforts to improve the teaching of geriatric medicine and to transfer relevant research findings to health care providers as soon as they are available.

In conclusion, although the number of individuals over the age of 60 is increasing with great rapidity, we are still left with the fact that our knowledge of their nutrient needs, nutrient intakes, and related factors is not totally available to us. It is for that reason, certainly, that the National Institute on Aging has made research on nutrition the subject of immediate priority.

All of us here will be very pleased to pursue any of these subjects and to answer any questions that you might have.

Senator McGOVERN. Thank you very much, Dr. Butler, for that excellent testimony.

In your statement you list seven nutrition aims of the National Institute of Aging research program. Were those intended to be a listing of your highest nutrition research priorities?

Dr. BUTLER. Yes; I think we are constantly, as a new Institute, going through reformulations, reconsiderations, priority setting, based on the cost to our country and the cost to families and individuals, and I can imagine that we might have additions or reordering of those priorities, but at the moment they stand as our best judgment as to seven very vigorous research priority areas.

Senator McGOVERN. I come from a State where we have a somewhat different range of problems than we do in the city. We don't have any public transportation, to speak of, in our State. The distances are great in the rural areas, and there is no public system available to our older people. So while we don't have the problem of high incidence of crime that may discourage people from going to neighborhood groceries, and so forth, we do have the transportation problem, the isolation problem of many people in rural areas.

Have you done any research on the nutrition problems of the rural elderly that would indicate any particular problems or responses that are needed?

Dr. BUTLER. I think that would be an extremely appropriate undertaking. I will ask Dr. Gibson if at the present time in our grant holdings we do have any work with respect to rural versus urban elderly and nutrition. I don't think we do.

Dr. GIBSON. We have nothing in our portfolio in this area.

Dr. BUTLER. We have nothing at this time, but it is certainly an appropriate area of research.

Senator McGOVERN. If my facts are right, we have a high percentage of older people in my State.

Your statement that we eat too many fats and sugars, and particularly salt, is generally in line with the findings of the dietary



goals in the report of this committee. Would you say you generally support the findings of our "Dietary Goals Report?"

Dr. BUTLER. Yes. I think it is also very important to say that because we don't know enough, sadly, about the later years, the variation that might be necessary with respect to those goals, that is, in terms of actual percentages and amounts, would have to follow upon a much more substantial understanding of the impact of age.

Senator McGOVERN. Do you have any specific suggestions or advice to the committee as to how we could improve that report to better fit the dietary needs of the elderly?

Dr. BUTLER. As I mentioned, we are really extremely pleased that we now are able to have an epidemiologist and demographer who will be working with the National Center for Health Statistics, because I would like to see that the nutrition survey conducted by the National Center include better measurements of older people who are in institutions—and so many are—and a better understanding of the age group 75 and above. As a result of such studies and collaborative efforts we might be able to make a much more realistic contribution to the question that you ask.

At this time, our information is so limited that I think we'd have to assume that the particular dietary goals designed mainly for the young are also applicable to the older age group.

Senator McGOVERN. You stated in your presentation that U.S. hospital and nursing home data indicate nutritional deficiency may run as high as 10 percent among the elderly. If you were to extrapolate to the total population, not simply those confined to nursing homes or hospitals, would that figure hold or would it be higher or lower in your judgment?

Dr. BUTLER. The "Ten-State Study," for example, purposely directed its attention to low-income people, and it would certainly appear that among many of our disadvantaged populations, that figure of 10 percent would be too low.

It also is the case that the more affluent may not get adequate nutrition because of personal grief or loneliness or other reactions. I am speaking really principally about women because women outlive men, and they tend to become less interested in preparing meals and dining in the same way they did when their husbands were alive. So even if there is no poverty, there are other deterrents to eating an appropriate diet.

I cannot answer your question on the basis of scientific studies, but I can give a clinical judgment that my guess is that it would be much higher than 10 percent.

Senator McGOVERN. You mentioned the shortcomings of the national nutritional monitoring and surveillance efforts with respect to obtaining good data on the elderly, and I suspect that is a problem with all of our citizens. What can be done to improve these national programs?

Dr. BUTLER. I think we have to look at the nature of sampling—and that would include, for example, people 75 and above. We have to look at the location from which those samples are drawn to make certain that we are identifying appropriate census tracts, including rural areas, urban areas, including areas of particular ethnic and racial groups.



Clearly a major scientific effort has to be made in correlating with the present-day surveillance system to improve the quality of questions, and samples, and the location.

Senator McGOVERN. As you know, Dr. Butler, it is very important that we have a baseline of knowledge about the nutritional requirements of the elderly. In our report, "Dietary Goals for the United States," we included an appendix which shows the state of knowledge on nutritional requirements. That appears on page 76. Do you have a copy of the report?

Dr. BUTLER. Yes, I do.

Senator McGOVERN. Would you look at the appendix on page 76. You will find a column there under "Aged." Is that an accurate description of what we know, the baseline of knowledge on the nutritional requirements of the elderly?

Dr. BUTLER. The tragic truth seems to be yes. As you point out, most of the areas under the aged are white, which indicates little or no data, and then a little more gray is fragmentary data.

I might turn to my colleagues and ask if they feel they wish to amplify on that point.

Senator McGOVERN. We'd be happy to hear from any of the other doctors.

Dr. BUTLER. It seems reasonable to assume that is a fairly valid depiction of contemporary reality insofar as our knowledge of the nutrition of older people and their requirements.

I seem to be getting concurrence from my colleagues.

Senator McGOVERN. If there are any suggestions that you or your colleagues have at any time with regard to improvements in that report, the committee doesn't regard that as having been written in tables of stone and it is subject to modification as we get more information. We have been under great pressure from some of the private industry groups to change the report. We have been trying to resist that unless we thought they had a clear case that could be sustained on the available evidence. But where there are suggestions that we think will give us a better report, we are more than happy to receive them.

Dr. BUTLER. On page 73 is an excellent table, on the magnitude of benefits from nutrition research. Perhaps, in due time, collaboratively with the other Institutes and with the National Center for Health Statistics, we might be able to be helpful in bringing that table up to date; in some instances, it relies on 1967 data.

Senator McGOVERN. Just for the purpose of putting it in a little more succinct form for the use of the committee, you cited a number of major health problems that could be prevented or at least improved through better nutrition. I wonder if you could summarize those for us again, Dr. Butler.

Dr. BUTLER. There may even be conditions that we don't know yet that bear on nutrition, but among some that are most dramatic in the later and middle years is osteoporosis; probably also in some measure a condition referred to as senile dementia, in which brain cells no longer function and for some obscure reason die; diabetes; and hypertension. Those are certainly among the most common and most devastating, not only in terms of their impact upon mortality and morbidity, but on the quality of life.



Senator McGOVERN. Diseases like heart disease and cancer, that we believe at least are diet related in some respects—all of those major killers affect the elderly as well as the rest of the population.

Doctor, you stated that 54 cents out of every Federal health care dollar is spent on medical care for the elderly. We are now spending 9 cents out of every Federal dollar for health care. That means we are spending about 5 cents or one-twentieth of every Federal dollar on medical care for the elderly.

Considering the major diseases that might be prevented or reversed by better nutrition, could you possibly give us some idea—I realize this would have to be a general estimate—of the dollar savings that might result simply from a stronger preventive emphasis which centers on improved nutrition.

Could we reduce that 5 cents that we are talking about to 4 or 3 cents with a reasonable preventive program?

This is one of the points Mr. Ringle made in his excellent piece in the Washington Post last Sunday, that our health program is becoming so expensive that as more and more people enter that age bracket above 65, we may come to the point where we can't afford to maintain health delivery at its present level.

Dr. BUTLER. I think that in reducing that estimated 54 cents per Federal health dollar spent on the elderly, we must target not only the elderly as a separate group, but also the group in their middle and later years. There is a transition during those years that can become a focus for prevention—looking for and becoming conscious of the various precursors of disease early, through proper detection, improving patterns of nutrition, and other measures. The last figures I am aware of suggest that less than 4 cents out of every dollar spent on health is spent on prevention. Increasing this effort so as to produce major reforms in our nutritional habits should produce more than compensatory benefits in reducing health care costs.

Senator McGOVERN. Let me ask this, Dr. Butler. I realize that in a field as large as this, preventive medicine is going to involve an effort that goes far beyond the Federal Government. It is a challenge to the whole health care industry of this country. But what do you see as the special role of the Federal Government in achieving a reduction in medical costs? What are the steps that could best be taken on the preventive side with special reference to nutrition?

This is something Senator Kennedy has been working on for some time. But this whole committee is interested in the role that nutrition and other benefits can play in providing better health, in eliminating some of these illnesses that are not only very painful and killing off people but are also enormously expensive to deal with.

Dr. BUTLER. As a physician recently returned to the Government, I have tremendous respect for the ability of the private and public sectors to work more effectively, but I also have criticism of our medical school education, not only in nutrition but how people change with age. In our medical schools we have not had systematic comprehensive teaching of geriatric medicine, most unfortunately given the fact that 54 cents out of every Federal health dollar relates to aging.

I don't think the Federal Government can do better than to provide a very effective body of knowledge on geriatric medicine, incorporate into medical school curricula, and collaborate as actively as possible in the areas of nutrition and aging.



Classically, medical school curricula are divided into two parts: The first 2 years which are the mainstream basic courses, and the last 2 years which provide more opportunities for effective clinical contact. It is often said that the school curriculum is too crowded. My own feeling is that no medical student, including myself, ever graduated knowing everything there was to know in medicine. That is not possible. But what must be learned is how to learn. And the mainstream courses in the first 2 years do not include the basic elements of nutrition and the basic elements of human development from birth through death, then we have denied students an opportunity to think in those terms and be conscious of keeping up with the relevant literature and reading.

I am not quite sure of the mechanism by which the Federal Government should influence prevention. However, I do feel a responsibility for our Institute to make available as effectively as possible knowledge that will be useful in appropriate reforms of the medical school curriculum, of other aspects of physician education, and of public education.

Senator McGOVERN. I will yield to Senator Kennedy.

Senator KENNEDY. I welcome you doctors, and I apologize for not being here earlier. I look forward to listening to your testimony and reading your statement.

Of course, there is very large responsibility on the deans of medical schools. There are many different kinds of questions that should be examined, the whole question of medical ethics and where we are going in terms of ethical questions, and the whole health area which has arisen more recently has enormous implications in terms of nutrition and many other things.

But the fact of the matter is, as I have seen in the health community, there is a general elitist attitude in most of the major medical schools. Many of the medical students who come in and have this general concern and attitude in terms of health care issues. Then, because of the funding process, which comes through the NIH and others, where the Federal Government is putting up hundreds of thousands of dollars in the medical schools for the latest research in cancer, heart, and all the other kinds of research, the general thing is to go into those kinds of areas, rather than into many of these other areas which have enormous important and general application.

There is obviously a role we could play in terms of the carrot on this, but the medical schools resent very highly the stick. And yet—as you and Senator McGovern who has been a national leader in this whole area of nutrition, understand—that is the situation. I almost wish on this particular question we had the deans of the medical schools listening to you, because Senator McGovern is a believer and I am a believer. But how we are going to get them to crack the whip, so to speak, on the various departments—I don't know if you have any ideas on that.

Dr. BUTLER. It may be idealistic on my part, but I had a most enjoyable and very exciting day with medical students of the American Medical Students Association Saturday a week ago. They had developed a program on geriatric medicine. It was their initiative to want to think about how the curriculum should change, and they certainly are the doctors of tomorrow. So in that sense I think there is reason for hope.



Senator KENNEDY. Doctor, I am sure you have followed them much longer than I. I talked to that convention and I met with those students, and they are way ahead and have been for about the last 8 or 9 years I have been chairman of the Health Committee. But getting some response from the schools themselves has been much more difficult than I would have hoped. I hope you are a very persuasive man, and I know you are going to be more persuasive than some. But I think it is something terribly important and I'd like your views on it, on what can be done.

Dr. BUTLER. I think, too, we always have to be keeping in mind the various responsibilities with respect to service, education, and research, and that were you to draw together thinking in terms of medical education and nutrition, geriatric medicine, ethics, and some of the various topics which indeed have been neglected in medical schools, it would also be valuable to bring in people who are within the Federal responsibility in education.

For instance, our Institute doesn't have any responsibility in training in clinical medicine. That is, we have not been given that authority by Congress, so that our opportunity to participate insofar as education is concerned is largely by model or through symbol or encouragement, but not through any other mechanism, including funds.

It would be unreasonable to expect that, in this time of fiscal restraint for American medical schools, it would be easy for them to develop new programs of teaching. This is particularly true in a field like geriatric medicine, where there are practically no trained teachers. It would therefore be necessary to develop a special fellowship program to teach the teachers. This would probably mean sending selected medical school teachers abroad, for example, to the United Kingdom. Thus I would think some Federal incentive would be appropriate and, indeed, socially wise, given the staggering changes in the numbers of older people and the associated health costs.

Senator KENNEDY. Let me ask you this. It gets, I think to a great extent, to the financing mechanism of our health care system, which is paying out for disease and for illness, and not in terms of preventive health care. And talking in terms of preventive health care, nutrition obviously has to reach the top of the list.

Now, what can you do to help us try to deal with that issue? I mean, how do we get acceptance—there are people in Congress, myself included, who understand, but how can we deal with that? Can you help us?

Dr. BUTLER. My professional judgment is that medicare is a very, very valuable and important concept, obviously, but was set up as though older people were young people. It doesn't provide for chronic diseases effectively; it doesn't provide for preventive checkups, for nutritional counseling. It doesn't provide for things for the older people to help themselves which might be cost containing.

I mentioned the reversible brain syndromes before you came in. These syndromes have come about because of drugs, congestive heart failure—anything that compromises brain nourishment and oxygenation. That turns very much upon nutrition and very much requires coverage by our medicare system. Yet, most of our coverage under medicare for mental health services only applies after the person is in the institution, not on an outpatient basis.



These are reforms our Institute certainly can't initiate. But in terms of a professional judgment response to your question, there is much that could be done to turn around this tendency toward institutionalization and the avoidance of some genuine efforts at prevention.

Senator KENNEDY. In the Health Committee, we are doing a year-long review of the National Institutes of Health, trying to find out how priorities are established, and who has an input in terms of those priorities. There really hasn't been a review at the National Institutes. And it is extraordinary, as we all know—at the last count, I guess 41 Nobel Prizes. It has been an Institute of excellence.

Dr. BUTLER. Superb.

Senator KENNEDY. I think all of us agree with that, and there is no question about it. But I am just wondering what you think in terms of the research development. Are we doing enough in terms of nutritional research? Is the NIH the proper place for it? Are we making enough effort? And if we are not, what recommendations would you have for trying to deal with it; how do we know whether what we are doing is sufficient? Is that an appropriate place for that kind of research?

Dr. BUTLER. It seems clear to me, being now back at NIH after a long separation, that it is a place of great ferment. The combination of expertise and cross fertilization of ideas that occurs at this institution has at least as great a potential for making remarkable progress in our understanding of nutrition as it has in so many other important areas. For example, I have felt extraordinarily pleased with how well received our new Institute has been by the other Institutes, since we are dealing with a broad biological process which is universal, progressive, and deleterious. We need, of course, to interact and collaborate effectively with the disease-categorical issues. There are some fascinating questions. Why is it that a woman over 30 with a cancer of the breast has a different course than a woman under 30? There are certain differences that occur in the immune system. So there are obvious scientific and practical reasons for interrelating.

What I am saying is that this era of new excitement at NIH is generating NIH-wide reexaminations of a variety of crosscutting universal topics—most importantly, nutrition, diabetes, and epidemiology. The NIA is doing its utmost to foster and participate in this collaboration.

Dr. Greulich, who is at my left and the Scientific Director of our Institute, is personally taking leadership in meeting with officials in the National Institute of Child Health and Human Development toward the creation of a nutrition research plan that would serve the two longitudinal Institutes and would stimulate interaction between NIA and the disease-categorical Institute. There is a good deal of profit in having that relationship with specific diseases represented by specific Institutes.

Perhaps Dr. Greulich would like to elaborate on the present effort that involves the consortium of Institutes.

Dr. GREULICH. Senator, I have little to add to what Dr. Butler has said, except it should be emphasized, as Dr. Butler did in his testimony, that the efforts of the Aging Institute are directed mainly at the impact of nutrition on sustaining health, rather than the point of view that is adopted quite logically by the disease-categorical In-



stitutes, wherein they are looking at questions pertaining to the impact of nutrition as a risk factor in disease. And this is an area of nutrition disease, that is, the sustenance of health, which has not been given adequate attention. Research on nutrition in the maintenance of health really needs to start with very fundamental epidemiological questions and a number of very basic scientific questions, particularly as they pertain to aging people, about which very little is known. Once we get that information base, then it seems to me, such research can move into the areas you are addressing: that is, how can we best impact on the citizenry.

Senator KENNEDY. I think this has been very interesting, very helpful. The question is how we find out whether what we are doing in those areas is reaching the optimum in terms of opportunity, whether there is too much in terms of disease treatment rather than disease prevention or in terms of preventive kinds of medicine, and how these priorities are set.

And particularly, you stated very effectively this aging population is growing dramatically in terms of the country, in terms of awareness and interest. And whether we are reaching those particular priorities is what I was wondering.

But we are going to be examining that over a period of time, and I thank you, Senator.

Senator MCGOVERN. Thank you, Senator Kennedy.

I'd like to follow up a little more specifically on the type of question Senator Kennedy developed with regard to what you are doing at NIH on nutrition research.

Here we have a situation where there is general agreement on the part of you and your associates that we don't know an awful lot about the nutritional facts—what we need to achieve better health—we also have rather clear evidence that if we knew more about that field and were doing more about it in terms of our medical schools and in other ways, we could greatly reduce the incidence of illness in this country, including reducing the major crippling and killing diseases.

Specifically, is your budget big enough? And, if not, what are you doing to try to get more funds into the nutrition research field?

Dr. BUTLER. The problem of funding is, of course, one that is not totally within our own control and is a function of management within HEW and the judgment of Congress. However we must also take into account the fact, that even with an inexhaustible amount of funds, we might not be able to spend them wisely. Would we have available knowledge and trained scientists who could work in the area of nutrition?

As I see it, it is a real chicken-and-egg situation. We have to have properly trained scientists to conduct the research, and grow in a reasonable manner that couples the scientific talents with the researchable questions.

There is no doubt of the research needs and research opportunities: They are enormous. In that sense, it is appropriate to say that the funds are not adequate to respond to the many existing research needs and opportunities. However, at this point it is very difficult to articulate manpower needs.

We have been pleased with the response we received from the community around nutrition and aging, in which we had 50 responses



from one announcement, which I thought was quite gratifying. I don't know if Dr. Gibson is in a position to comment on the quality of those proposals or not, whether they appear to be of particularly good quality or average quality.

Dr. GIBSON. I think the applications and inquiries we have received to date have come from the Nation's major research institutions, where an intensified interest in aging seems to be centered. For instance, we have received proposals, inquiries, or proposal outlines from institutions such as Berkeley, Harvard, the University of Washington, and the University of California at Davis. These vary from basic studies in nutrition to clinically oriented studies on nutrition and the nutritional requirements of the aging.

Senator KENNEDY. If Senator McGovern will just yield further, one of the things they are doing in Canada—which is a rather interesting proposal—is that in their social security checks every month or every 3 months, they also include a little folder of tips for the elderly. A very substantial part of that is on nutrition—on things to eat. They have it fairly well refined into seasons, so that they suggest the different times when different products are coming on line, even with the consideration of what the cost will be—advising people. It is done in two languages—very simple and very colorful.

And it seems to me that the use of perhaps that great mechanism of the social security check could also be used wisely in terms of counseling and helping elderly people.

I am sure you are familiar with the experience—I don't know if you have thought about it or whether we ought to be trying to get the people in the Social Security Agency up here and ask them if they can't do it or why they shouldn't do it. Can you tell us whether it should conceivably be done here? What can you tell us about that mechanism of education of people in the community?

Dr. BUTLER. I certainly think the social security check is a viable mechanism. As you may recall, however, there was a good deal of concern about its political misuse in 1972. There might be good reason to seriously consider the ramifications of setting a precedent as to the use of the social security check as a medium for information transmission.

We do take very seriously efforts at providing information for older people.

I mentioned earlier the reversible brain disorders which are probably the condition of as many as 13 percent of the people who develop what, from the public point of view, is called, "senility." These reversible conditions are also not well understood by many physicians.

Therefore, we decided it was imperative to sit down and create a consensus guideline for the evaluation, treatment and care of these brain conditions. Following the development of a guideline which will reflect consensus among medical scientists and the various associations, such as the American Heart Association, the American Geriatrics Society, and the American Society of Internal Medicine, we will translate it into terms that are easily understandable by the public. The NIA information office is considering the possibility of targeting shopping centers where there are high concentrations of older shoppers for the purpose of conducting experiments on effective information dissemination.



One of the things older people understandably fear the most is "losing their mind" and "being put away." If we can be of immediate instruction to them in a manner that will help them notice within themselves something bearing upon, for instance, the problem of nutrition and brain function, then we want to do so.

Senator KENNEDY. I think we ought to try to pursue further the possibility—I'm sure the system will be revised, and, hopefully, we will communicate nutrition messages to our elderly.

One of the other real tragedies, in terms of our system, is that we in the United States don't have a continuing education system for doctors. Just about every other country in the world has some form of it. And you know the efforts to try and just devise for primary care physicians, who really lead the way in the country—if we could establish a continuing education process and then relate this to what you are doing and finding, using that as a way to communicate this kind of information, it seems to me it would be valuable.

Senator McGOVERN. Dr. Butler, in the article I referred to earlier, written by Mr. Ringle in the Sunday Washington Post—and I am going to ask that that be printed as part of our hearing record—it says it makes a great deal more sense for the Government to spend \$5,000 on an individual over the course of his lifetime in preventing a chronic late-life illness than to spend \$100,000 at the end of his life trying to pick up the pieces.

That is obviously commonsense. I don't see how it could even be debated.

And yet, we have this situation that has been alluded to by Senator Kennedy, where we really don't place the emphasis as we should on these preventive measures.

Our committee asked the General Accounting Office to do an analysis of why we aren't more effective in terms of nutrition research, what are the barriers to expanding it. And they have given us an interim report that you may or may not have seen, but they concluded there are three principal barriers to adequate nutrition research in the United States.

One is the lack of Federal coordination.

Two is the lack of trained people, as you pointed out here awhile ago.

And three is the need for a larger extramural grant program to deal with people outside of the Government.

Would you generally accept those three points as serious barriers to expanding our nutrition research program?

Dr. BUTLER. Yes; particularly the obstacle of an insufficient number of trained people. I think some of the problems of coordination and fragmentation are now at least under considerable discussion among the various agencies, just as they are among the several Institutes of the National Institutes of Health.

So I feel that the area of Federal coordination is a much more immediately solvable problem in terms of the allocation of proper responsibilities.

But the longer range goal, that of education and training, presents a major obstacle. Dr. Greulich has had the opportunity to review for the Institute the GAO response on training needs and might want to speak on that.



Senator McGOVERN. I think we not only might want the identification of the problem, part of which is the lack of trained personnel initially, but what we could do to get more people. What is the responsibility of the Congress and the Federal Government in securing more trained people in this field who are capable of carrying this responsibility?

Dr. BUTLER. I am going to turn to my colleagues once again to see if they might have some thoughts on that matter.

As far as the medical school situation or, for that matter, doctoral programs in nutritional biochemistry, you must have the models, the teachers who are regarded with esteem, before you can recruit able students. And the field must become effective and viable. Unfortunately, I think there is going to be a timelag, in that respect. I think Dr. Gibson, who I know is interested in training and the extramural program, might have some further thoughts on this subject.

Dr. GIBSON. I think the most effective means of expanding research in nutrition and aging is to take the approach used in establishing aging research in institutions throughout the country. For instance, we must hold seminars and symposia to point out the existing challenges and the unique problems in conducting this kind of research. Without this kind of incentive and community involvement, effective organization of the program is not possible.

We have organized a number of other programs this way: By planning symposia, and then moving across the country to organize the various departments and universities into an area of interest.

Senator McGOVERN. I think, Dr. Butler and members of the panel, that one of the problems is that we don't have enough sense of urgency on this matter in preventive steps in the medical profession.

There is a letter that came to my attention, written by Dr. Richard Jones, Director of the American Medical Association. He was responding to a woman who had written him deploring the death of her husband at the age of 57 from an atherosclerotic attack. And he says, in effect—maybe I should just read this. I don't think there is anything confidential about it, but he says, in effect, that there really isn't very much that could have been done to prevent that heart attack. He says,

In fact, it could be said that hardening of the arteries is so common in middle-aged men as to be almost universal. The importance of cholesterol, the effect of diet upon it, and the beneficial effects of exercise are all presumptions that have not yet been proven by experiments.

He says there is a nationwide study called the "Multiple Risk Factor Intervention Trial" going on to test the possibility that improvement in one's cholesterol, body weight and smoking habits will indeed affect life expectancy.

But the general thrust of the letter—I don't want to read the whole thing—is that these things are really kind of guesswork, that after you get a little older you have to expect maybe a heart attack will take your life.

I wonder if you could expound on that. It does seem a callous view for the AMA to take. Maybe we haven't absolute scientific proof that diet, exercise, and cholesterol levels are related to heart attacks, but it seems to me there is a growing consensus that they are related, and I wonder if you could respond to that.



Dr. BUTLER. In our "Baltimore Longitudinal Study," we have had some study on triglycerides and cholesterol, which seems to be related to the interest of the public regarding these problems. As you know, there has been a decline in strokes and in other evidences of cardiovascular-type induced mortality over the last several years. Perhaps this may be a hopeful sign that the public is treating the problem with some urgency, even if some of our medical friends are not as conscious of it as they might be.

I know certainly that many medical people are increasingly taking nutrition seriously.

There is something else you said that I'd like to respond to, if I might. That is, I don't like the idea that prevention should only be thought of as important early in life. There are still things one can continue to do in middle and late life. The concept that, "Well, because you are getting older it is more likely you will have a coronary or something," is the kind of stereotype I hope very much we can rid ourselves of. The capacity for maintaining decent physical fitness, nutrition, watching over a variety of possible diseases through early detection, and our own active self-monitoring, are things which we can continue to do. And I don't believe we should simply throw in the towel because we are now 40 or more years of age, and presume then that all of the particular events that are antecedents to disease have already been set. Prevention should be seen as a lifelong process.

Senator McGOVERN. So even though it might be desirable to follow a healthy diet from age 1 or even earlier on, it is never too late to be beneficial. If a person in their sixties and seventies improve that diet, isn't there evidence that he can improve his health and chances for a longer life?

Dr. BUTLER. Again, I am trying to be faithful to the scientific truths. We have yet a tremendous amount to learn. And so in answering affirmatively to your last question, I have to hedge in saying that we still have a lot more to learn for such a statement to be compelling to scientists, doctors, and the public.

But it is a reasonable professional judgment at this time, that one can count on continuing effectiveness of preventive actions, even in later years.

Senator McGOVERN. You referred, Dr. Butler, to the Older Americans Act. As you may know, we have a bill pending, S. 519, to expand title VII of that act, including the meals-on-wheels program.

It has always struck me that that program is one of the best things we have going. It is a rather modest program, but to be able to deliver a hot nutritious meal to a homebound elderly person strikes me as one of the most useful things we can do.

Can you give us some estimate of how many Americans would benefit from that kind of program if it is adequately funded and staffed?

Dr. BUTLER. My latest understanding was that at least 7 percent of Americans are somehow housefast. They may be bedfast, chairfast, or they may be unable, for a variety of reasons, to be transportable.

And the figures I have are that somewhere around 280,000 to 300,000 people over 60 do participate in the nutrition program.

Again, I have to add the sad fact that we don't know if there might not be differing nutrients that the older population should be receiving in the nutrition program. But because we do not have an adequate



scientific data base, we assume that older people's absorption of food-stuffs is the same as if they were 20 years of age.

Senator MCGOVERN. Before I yield to Senator Kennedy, there is another bill he and I have been interested in, S. 1116, that provides for reimbursement for nutrition counseling under the medicare program. Do you think that kind of legislation is valid?

Dr. BUTLER. My reaction is that we should pursue any means by which we can help counsel people, either on an individual basis or at the congregate meal site which is a major resource. There are now 5,000 centers throughout the United States at which efforts could be expanded in the field of nutrition.

I think that any action that would move toward further counseling, where the older person has a responsibility in his or her own care, is advantageous.

Senator KENNEDY. Senator McGovern was inquiring about whether it is ever too late to alter a condition by diet. In your statement you referred to the diet of elderly people and the use of drugs, which is an important factor. I wonder if you could elaborate a little bit on what you have been able to determine.

We have a rather interesting panel that has been established with the support of the drug industry and it is doing a review about adverse drug reactions. And it might be worthwhile as they are doing this study over a 2-year period to require that they review the relationship between adverse drug reaction and nutrition.

Could you elaborate a little bit on that?

Dr. BUTLER. I'd be happy to.

Senator KENNEDY. Maybe you could spell out if you think it's useful to have them review this area as well.

Dr. BUTLER. Dr. Steven Kennedy, who is the Executive Director and who has been very active in this respect, contacted me, and the two of us decided to bring together various people within the Federal Establishment related to aging and pharmacology, particularly regarding long-term nursing care. Dr. Fay Abdellah's office and others were interested. I hope it was useful to Dr. Kennedy.

Among other research lags is the area of drugs and age—we are really caught up in an "operation catchup" in the field of aging because there has been so much "undernourishment" of gerontology and geriatric medicine, speaking of nutrition, and we have had one problem after another to contend with. The same kinds of problems emerge in the area of drugs and age as in nutrition and age. Are drugs absorbed differently by the body as we grow older? How are they metabolized? The same types of questions can be asked of drugs as of nutrients. We also invited Dr. Kennedy to a very useful pharmacology and age workshop which we held, where we received some useful responses from Dr. Jick of the Boston Drug Surveillance Project, which we had contracted for. The project's computerized data include the results on some 35,000 patients in hospitals here and abroad, data related to age, which had not previously been looked at.

For a minimum amount of money, we could get information on adverse toxicology with respect to the older age group.

But it is interesting that this computer does not hold data on nutrition. It may be a function of the history of our times. At the time the project was first developed, there might not have been an adequate awareness of the importance of this problem.



Senator KENNEDY. What about the use of vitamins? What does your research show on that?

Dr. BUTLER. What particular research do we have?

Senator KENNEDY. Yes, in terms of vitamins.

Dr. BUTLER. In the "Baltimore Longitudinal Study"—and Dr. Greulich may want to pick up on this—through collaboration with the late Dr. Paul Gyorgy, we had serum measurements of pyridoxine and riboflavin, among other measures, and an opportunity to look at the continuing history of those individuals under study with definitive biochemical measures related to nutrition. You may want to develop some of that.

Dr. GREULICH. I won't develop it very far.

The primary interest has been in the vitamin levels in people as they grow older. Particular attention has been paid to pyridoxine levels as one example of a vitamin for which there are sensitive analytic techniques. Not surprisingly, it is found that with pyridoxine, as well as with other vitamins, the general body levels fall with age. Many of the people in our longitudinal study are, I might add, as I think it was indicated in the testimony, well-educated and of an above-average socioeconomic class. Many of them, therefore, supplement themselves with vitamins, and these people carry higher levels of any particular vitamin you care to name.

Unfortunately, there are no data available yet that suggest either: (a) That the gradual falling off in serum levels of vitamins with age is bad—one would infer that it might be, but there is no hard evidence for it; and (b) that there is any evidence that the supplementation is good.

Vitamin supplementation probably doesn't do any harm, but there is just no hard evidence yet that it is significant in terms of predicting morbidity or mortality.

Senator KENNEDY. That is interesting.

Let me just ask a final question of Dr. Butler.

To get back to an earlier theme, what is being done in the area of research on nutrition and the elderly to find ways—how much research is being done on getting the latest information out to the people in the most effective way? Is there such research being done?

Dr. BUTLER. I don't know of any research that is being done on the techniques of communication, but it seems to me that we have a definite responsibility to convey directly to both health providers and to the public any new knowledge which we accrue related to nutrition and aging.

But I am not aware of any studies that are related to that particular problem. There are some obvious things that can be said, however. For instance, it is very important that labeling on foods be in large type.

Senator KENNEDY. Well, it just some time might be of use. You realize the amount of research that is being done by the companies in terms of how to get their message across, in terms of nutrition and pressing and pushing a product. It would be of some value and use for us to find the most effective way of communicating the kinds of information that we have heard here this morning to benefit the elderly people. And how that could best be done, I think, is important to know. Perhaps we will pursue that further.



I want to thank you very much. It has been very interesting, and I will be interested in examining the detailed statement.

Senator MCGOVERN. Dr. Butler, just a couple more questions here. Before I do that, I want to be sure that your excellent publication, "Our Future Selves—A Research Plan Towards Understanding Aging," be printed as part of this hearing record.<sup>1</sup> I think it is an excellent study.

You referred, Dr. Butler, to protein and its relationship to longevity. Obviously too little protein is bad but is too much harmful as well?

Could you explain a little more fully your findings and relate them to the "Dietary Goals Report" in which we have recommended that 12 percent of our calorie intake be from protein sources?

Dr. BUTLER. I am going to call upon Dr. Barrows, who has been a major contributor in this field, and who wrote the important chapter on nutrition in the new "Biology of Aging Handbook," to discuss that subject.

Dr. BARROWS. Thank you, Dr. Butler.

Senator, I would like to go back 1 minute, if I may, to page 76 of appendix C of your report.

Senator MCGOVERN. Yes.

Dr. BARROWS. I am not totally sure that this is really representative. I don't think we have the kind of knowledge that is indicated here.

Let me take proteins. We have fragmentary data that lie somewhere between none and something. But according to what I think I know about what is available, there have been only four studies on the effect of age on protein requirements. These have involved, in each study, something like 4 people, 8 people, and 27 people.

The results indicate that the requirements may range anywhere from 0.5 gram per day per kilogram up to greater than 1 gram.

Essentially I think that this represents little or no data. It should be an empty block, because that is very, very fragmentary.

It bothers me a little bit that we are concerned about informational transfer when we don't yet have the information. It seems as if, Senator, few people realize how little information we have in the area of nutrition and the aging.

If I may, I think that where we really need help is in the support of research to get into these questions concerning the nutritional status of older people. Until we know that, we can tell them very little that is definitive.

Senator MCGOVERN. I agree with that.

Dr. BARROWS. So, at the risk of overstating a point, I feel very strongly that four studies involving four to eight people is as good as nothing. And I think what is said for proteins and amino acids might also be said for vitamins.

Senator MCGOVERN. Yes.

Dr. BARROWS. Regarding Dr. Butler's reference to protein levels, there has been since about 1915 to 1917 a block of experimental data which indicates very clearly that with dietary manipulations, one can increase the lifespan in animals from roughly 50 percent to twofold or threefold. Among the dietary manipulations is that of reducing the dietary protein.

If dietary protein is reduced, one can increase the lifespan of our animal model systems.

<sup>1</sup> See p. 41.



Also associated with this manipulation is a delay in the onset of diseases. The incidence of diseases, by and large, is age related. You can shift over to later ages the times at which diseases found in animal model systems occur by reducing the dietary protein.

These results suggest that we do not yet know the optimal level of protein intake. We do know that we have reduced the dietary protein in our animals and have increased the lifespan by 25 to 30 percent. Since this information is not directly transferable to human beings, these are the kinds of basic questions that we need the answers to, through research, in order to be able to tell people what to do.

Senator MCGOVERN. Dr. Barrows, Dr. Butler and other members of the panel, I'd like to reserve the right for us to possibly send you a couple of additional questions that we might want more information on.<sup>1</sup>

I have to race to the Senate floor. There is an amendment that I am the sponsor of that has just been called up, and that quorum call was just to give me time to get over there.

We deeply appreciate the testimony this morning. Thank you.

[Whereupon, at 11:05 a.m., the hearing was adjourned, subject to call of the Chair.]

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<sup>1</sup> See p. 38 for additional questions and response from Dr. Butler.



## APPENDIX

STATEMENT OF ROBERT N. BUTLER, M.D., DIRECTOR, NATIONAL INSTITUTE ON AGING,  
DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE, PUBLIC HEALTH SERVICE,  
NATIONAL INSTITUTES OF HEALTH, BETHESDA, MD.

Mr. Chairman and Members of the Committee: I greatly appreciate this opportunity to discuss Nutrition and Aging with persons who share my conviction on the vital importance of proper nutrition to the well-being of the aged population. I am also pleased to be able to share with you NIA's programs and plans for research on the role of nutrition in maintaining the health of older people. To help us explore these topics, I have asked Dr. Richard Greulich, Director of NIA's Gerontology Research Center and Scientific Director, NIA; Dr. Charles H. Barrows, Acting Chief of NIA's Laboratory of Cellular and Comparative Physiology at the GRC; and Dr. Don C. Gibson, a Health Scientist Administrator in the Extramural and Collaborative Research Programs, NIA, to join me today. All of us are actively involved in developing a comprehensive research program in nutrition and aging for the NIA.

We all agree that proper nutrition throughout life, including in late life, is an effective means of maintaining good health and minimizing degenerative changes in the later years. As you have stated many times, nutrition is a cornerstone of preventive medicine. The great reductions in morbidity and mortality that have occurred in this century have been due mainly to the prevention of infectious and nutritional diseases. Curative medicine has undeniably played a major role in health improvements since 1900. Equally undeniable, though, are the enormous effects of preventive measures such as sanitation, immunization, and the provision of a diet adequate in the required vitamins, minerals, and other food elements. It is only through adequately nutritious diets that old people retain the capacity to remain active and productive. These are only some of the reasons why nutrition research is one of the NIA's highest priorities.

From the initial base of nutrition research inherited from NIA's parent Institute, the National Institute of Child Health and Human Development, the NIA has worked steadily to improve its programs. Since the formation of the NIA in 1974, there has been a five-fold increase in nutrition support through NIA's research grant program. Most of this increase has come from NIA's attracting prominent nutrition scientists to the field. Nutrition research is already deeply imbedded in many programs of the NIA Gerontology Research Center, or GRC; nevertheless, NIA's laboratories are coordinating a major program development effort in nutrition with the Institute's extramural program. We expect this program growth to be rapid.

Our grant program recently issued a Request for Applications (RFA) on Nutrition and Aging, outlining our priority research interests in this subject. Both Dr. Gibson and I will be discussing this RFA further, including the encouraging response we have received. To date, more than 50 researchers, representing most of the major research centers in the United States, have expressed their interest in submitting a research grant proposal on nutrition research to the NIA within the coming fiscal year. From this and other attempts to stimulate new, high quality research efforts, the Institute's grant support in nutrition research, funds allowing, may double over the coming fiscal year.

Another means NIA is using to catalyze research interest and utilize exceptional research talent in our nutrition planning is to sponsor a major conference on "Nutrient Utilization and Nutritional Status of the Elderly." This conference, scheduled for early 1978, is expected not only to expand research interest in the field, but to identify studies which warrant coordination or collaboration with the various NIH Institutes.

To coordinate our efforts at the NIH, there is a Nutrition Coordinating Committee which has drawn together the various initiatives in nutrition research



among the various National Institutes of Health. This has provided an effective focus for exchange of scientific information, the avoidance of duplication, and potential scientific collaboration.

The Institute most closely aligned with the NIA in research on clinical nutrition is the National Institute of Child Health and Human Development. Dr. Greulich is the principle NIA staff member working with representatives of the NICHD to explore the development of a program for collaboration between the two Institutes on the role of nutrition in sustaining optimal health throughout life.

The NIA Baltimore Longitudinal Study, a multidisciplinary study now involving about 650 male volunteers, has included an evaluation of nutritional factors in over 1,000 participants for nearly twenty years. In January, a large cohort of female relatives of these volunteers will be added to the all-male study, making it one of the first intensive biomedical family longitudinal studies in history. Much of the relevant dietary and metabolic data are ripe for analysis as to the role of these controllable variables in the life history of the participants. The addition of female spouses and other family members will permit dietary cross-validation and vital comparison of the differential effects of diet on the two sexes.

Epidemiologic research on the dietary intake and nutritional status of the aged population in the United States has been inadequate. Data from well-designed studies are an essential base for research on nutritional requirements, the impact of nutrition on health, and the management of nutrition programs for the elderly. The NIA has recently selected an outstanding American epidemiologist as its Associate Director for Biometry, Epidemiology, and Demography. He will work closely with the National Center for Health Statistics and other appropriate government agencies to correct the neglect of the aged in research on nutritional status.

To expand our program of clinical nutrition, NIA staff have been making researchers in aging aware of the valuable resources of NIH's 83 General Clinical Research Centers. Many of these centers are equipped with metabolic diet kitchens and have properly trained research personnel to enable precise research on nutrition and aging. However, based upon discussions with the Division of Research Resources (DRR), which administers the GCRC program, the NIA has learned that hardly any age-related studies are being done in these centers. Coordinative efforts between DRR and NIA will continue to develop nutrition research projects at one or more of the GCRC's.

Finally, the NIA has a major responsibility to see that first-rate scientists are trained to study the problems of nutrition and aging. The NIA hopes to be able to apply every training support mechanism at its disposal to increase the number of researchers in this area. In particular, our Extramural and Collaborative Research Program intends to issue an Announcement in the NIH Guide to Grants and Contracts encouraging the development of research training projects in various aspects of nutrition and aging.

As we go along, we will discuss these major NIA initiatives in greater detail. The overall mission of the NIA is to conduct and support biomedical, social and behavioral research and research training related to the processes of aging and the diseases and other special problems and needs of the aged. The NIA research program in nutrition aims to expand the knowledge based on:

- (1) What constitutes an adequate diet for the older person, focusing on the changes that occur with age in the need for nutrients;
- (2) What older people eat;
- (3) The factors that affect eating habits—economic, behavioral, and physiological;
- (4) Changes in the physiology of digestion with age;
- (5) The assimilation of nutrients into the body tissues in the older person;
- (6) Risk factors for pathology in middle and old age correlated with nutritional status; and
- (7) Topics of special significance, such as the interaction of nutritional variables and drugs.

Determining the normative aspects of nutrition and aging is necessary for refining nutrition service and education programs and for distinguishing between health and disease. In particular, understanding the motivations, disabilities, and misunderstandings which affect eating habits can be exploited to prevent some of the malnutrition that results in costly deterioration in health. Even applying some of the knowledge already available on nutrition could have an important impact on health.



We are all aware that many Americans of all ages may eat too much. Many people pay for their improper eating with their lives. But it is essential to note that changing bad habits can have a positive effect at any age. For example, more than one study has shown that some of the adverse effects of smoking on pulmonary function are reversible merely as a result of quitting the smoking habit in a population with a mean age of 71 years of age. The results of such research can help give older Americans the proper motivation for maintaining high standards of nutrition throughout life. However, a caveat is in order. Changing the diet and related habits of the U.S. population involves massive cultural and educational transformations. Effecting the needed changes identified through research requires such major initiatives as improved programs of mass education—involving public schools, health providers, and the media; improved nutrition education of health professional; and more complete disclosure of food content, as through adequate labeling of packaged foods. These efforts are far beyond the areas of expertise or mandate of the NIH, but every effort will be made to effectively transfer new knowledge obtained through research to such programs.

Not the least of these benefits is health cost containment. In the U.S. alone, each day brings a net increase of 1,400 persons in the elderly population. Current U.S. Bureau of the Census projections show that at least 17 percent of the American population will be over 65 years of age by the year 2030. As illustrated by the attached figures, the old comprised four percent of the U.S. population in the year 1900. In only fifty years, older persons may make up one-fifth of the population. In 1976, the old made up approximately 10.5 percent of the American population. Yet 54 percent of every Federal health care dollar—a total of nearly \$20 billion—was spent on their medical care. This explosion in the absolute numbers and relative proportion of the aged population demands that full attention be paid to research on ways to prevent further disease and disability. One of these is clearly nutrition.

Recognizing the enormous contribution adequate nutrition could make toward improving health, the National Institute on Aging has given very high priority to research on the nutritional status and requirements of the aged. Since 1958, a longitudinal study of human aging has been conducted at the Gerontology Research Center in Baltimore. This Baltimore Longitudinal Study is the most intensive longitudinal study of aging in the world and in it heavy emphasis is placed upon nutrition. To date, more than 1,000 men have been studied, ranging in age from the early 20's into the 90's. Their 2½ day visits at 1 to 2 year intervals provide the data which will permit NIA scientists to evaluate the role of nutrition in the maintenance of general health as well as the development or prevention of age-associated diseases.

Nutritional status is also examined in terms of its influence on time-dependent rates of change in physical, physiological, biological, and intellectual functions.

Dietary information was obtained from longitudinal study volunteers using a one-week diary technique. Computer technology permits the conversion of this type of information into detailed nutritional data on intake of calories, proteins, fats, and carbohydrates; specific types of fatty acid and carbohydrate ingested; and vitamin and mineral consumption. Measurements of obesity, glucose tolerance, and cardiac status (as indicated by history, physical examination, and resting and stress EKG) are also available for analysis. The subjects are a highly educated group who provide detailed and reliable dietary information. They are also unique in that they range in age from the earliest to the latest adult years of life. Furthermore, since the same individuals are studied, repeatedly, the effect of aging on dietary habits and the impact of secular influences on nutritional preferences can be tracked. The addition of female volunteers, mentioned earlier, will complement this analysis.

Long-term differences in nutritional patterns among individuals can be correlated with various "outcomes." For example, the longitudinal study is investigating whether those individuals who retain good health, both physically and intellectually, share certain nutritional characteristics which differ from those of individuals who age poorly. The study seeks to determine whether there are recognizable nutritional precursors to some of the common diseases of the elderly (diabetes, dementia, osteoporosis, obesity, etc.). The intensive study of each individual will make it possible to assess the effects of nutrition on the rate of decline in function in a variety of organ systems. The complex interplay of nutrition with activity levels, with the composition of the body tissues, and with metabolic variables such as glucose utilization and insulin secretion may help



to explain the unusual age patterns in the concentration of cholesterol and other fatty substances in the blood.

In addition to research associated with the longitudinal study, the GRC conducts research on the relationship between nutrition and longevity. As a first approach to this research objective, studies have related the biochemical characteristics of the tissues of animals subjected to several dietary regimens known to increase life span. These results have supported a working hypothesis that increased life span associated with reduced dietary protein intake may be related to the rate of genetic informational transfer. Attempts will be made to confirm this hypothesis by measuring the rates of turnover of various tissue proteins in these animals.

Undernutrition has been the only environmental factor which has consistently increased the life span of animals. In addition, studies on animals have clearly shown that animals choosing to consume larger amounts of food, perhaps with lower protein content, were more likely to be short-lived and have increased susceptibility to disease than animals whose food intake was smaller. These observations lead to a number of attractive speculations. Before falling prey to such speculations, however, we must learn whether the increased life expectancy derived from restriction from food intake is extracted at the price of decreased functional responsiveness, particularly in relation to such functions as mental ability and reproduction. This problem is now being studied.

A study by H. D. Chope of the relationship between nutrition and health in aging persons showed higher mortality over a four-year period among those older subjects who had reported lower intakes of vitamin A, niacin, and ascorbic acid. Similarly, E. D. Schlenker studied the survivors of a random sample of 97 women previously surveyed in 1948, when their ages ranged from 40 to 88 years. This follow-up study revealed that deceased subjects had lower intakes of protein and ascorbic acid when both groups were examined in 1948. By 1972, the time of the follow-up study, the survivors were found to have decreased their intake of calories, carbohydrates, and fats while maintaining adequate intakes of other nutrients.

But some findings regarding nutrition in human beings actually seem to differ markedly from studies on animals. Although many of the hazards of overweight in human beings have been studied, a curious discrepancy needs thorough evaluation: the overall mortality rate appears to be lowest in individuals who are currently classified, on statistical grounds, as being obese. There appear to be some beneficial effects of mild and even moderate obesity in the elderly. The mechanisms of these effects and their relationship to the ideal or desirable body weight of the middle-aged and elderly deserve additional research. The necessary studies will extend far beyond simple correlations of dietary intake with morbidity and mortality. The accompanying changes in nutrient metabolism and cellular function with age must be carefully investigated.

In relation to nutrition and longevity, the NIA has identified an important need for prospective studies, with special attention to how nutritional patterns affect survival times. We are especially interested in middle-aged populations of age 35 to 55. These studies would focus on the physiological and biochemical profiles distinguishing survivors from non-survivors.

While we recognize the need for additional knowledge, some evidence has shown that the need for protein is at least as great in the elderly as in younger age groups. However, we do not know with any degree of accuracy whether progressing age introduces significant variations in the manner in which nutrients are handled by the body. Such aspects as digestion, absorption, gut mortality, amongst others, have not been looked at systematically in healthy older people.

However, the effects of chronic disease upon the absorption and utilization of ingested nutrients is not well understood. Various diseases may, for example, decrease the absorption of vitamins in the aged and thereby increase their minimum requirements.

Aspects of nutrition besides the provision of nutrients must also be considered. Sufficient roughage must be included in the diet, and sufficient water must be consumed to preserve bowel regularity. Recent evidence suggests that roughage may be useful in reducing the risk of diverticulitis and cancer of the large bowel.

The NIA is in the process of an intensive planning effort to identify specific areas in which additional clinical and basic research is needed to increase knowledge on changes with age in nutritional needs. For example, the NIA plans to increase its emphasis on research to identify specific variations in age-



related dietary requirements for vitamins, trace minerals, fats, carbohydrates, and proteins. The specific nutritional requirements of the aged in relation to changes in body composition, food preferences, sensory perception (particularly taste and smell), and digestion and utilization of nutrients need to be assessed. Studies are also planned on the effect of vitamin supplementation on overall physiologic performance, health, and well-being of the elderly.

In addition, nutritional factors may take on special significance at particular stages of the life cycle. For the elderly, these periods often may include menopause, times of great psychological stress, grief, and depression. The NIA is calling for increased investigation on the interrelationships among caloric intake, age and physical activity, economic status, and emotional stress, especially that associated with grief, bereavement, or isolation.

The aged patient is a major user of drugs. There is evidence that, like variations in nutritional needs, drug responses in the elderly are also different from those of young adults. It can reasonably be assumed that interactions of drugs and nutrition have special relevance for the elderly. For example, deficiencies in fat-soluble vitamins such as A, D, and E in the aged are frequently due to interference in absorption caused by the habitual use of the common laxative mineral oil, which drains away fat-soluble vitamins.

In addition, various drugs used in the treatment of chronic diseases are known to interfere with the absorption or utilization of specific nutrients, including vitamin B<sub>12</sub> and folic acid. The possible synergistic effect of a borderline nutrient intake with prolonged drug therapy in the older adult may also be a fruitful area of investigation. The knowledge to be gained from studies of the role of nutrition in connection with gerontological pharmacology is essential for sound geriatric medicine practice. Understanding the interaction between nutrition and exercise in the aged is also important. It may not be possible to obtain adequate nutrition and maintain a desirable body weight without some exercise. Exercise and nutrition should be coordinated carefully in a program of health maintenance. Toward this aim, the NIA and the President's Council on Physical Fitness and Sports are co-sponsoring a Conference on Exercise and the Elderly on October 27-29, 1977.

A rational basis for determining nutritional requirements for the elderly, however, can only be developed if we understand how nutrient metabolism changes with age. Diet alone does not determine nutrition. Patterns of movements of nutrients through the intestinal tract, for example, partially determine how much of a given food substance, once ingested, is made available to replace worn tissue or fuel physical activity. The integrity of muscle in, and autonomic nerve supply to the digestive tract and other aspects of digestion will be studied to identify significant changes with age and their effects.

There is a vast lack of information on the nutritional adequacy of the diet of elderly individuals. Nutritional status studies such as the Ten-State Nutrition Survey have shown that many older persons have health problems stemming from nutritional deficits. United States hospital and nursing home admission data indicate that nutritional deficiencies run as high as 10 percent. The principal Federal food consumption studies, including those of the U.S. Department of Agriculture and the Health and Nutrition Examination Survey of the National Center for Health Statistics, confirm that the diets of older Americans are often below standard both in quantity and quality. Although much of the data generated by these surveys and studies warrant additional analysis, they have all had serious methodological problems which have made their findings difficult to apply to the general aged population.

For one thing, national studies have not sampled the elderly population adequately. For example, the Health and Nutrition Examination Survey has data up to age 74 only. Another serious shortcoming is that those most likely to be malnourished are seldom included in such surveys, either because they are unable to respond to the survey procedures or because they are in institutions. And nutritional studies of institutionalized patients have not been designed to complement other surveys. Studies which depend on the ability of participants to estimate and recall food intake accurately have been shown to be particularly misleading with older persons. Overall, too few elderly individuals have been examined.

Well-designed epidemiologic studies of food and nutrient intake in different populations in relation to longevity and age-associated disorders are therefore sorely needed. Among his other duties, the NIA's new Associate Director for Epidemiology, Demography and Biometry will consider the design and implemen-



tation of such a study in collaboration with the NCHS. To be most effective, the study should include an evaluation of dietary intake, a clinical examination, and biochemical measurements of blood and urine, and should be designed to highlight the distinction between clinical symptoms associated with nutrient deficiencies resulting from the aging process and symptoms resulting from a lack of nutrients. Methodology must be developed to simplify this procedure, making possible more evaluations of older individuals. Complete and up-to-date nutritional status information is essential to manage food assistance and service programs properly, to monitor the impact of economic conditions on nutrition, to regulate food labeling and advertising, and to give direction to mass education programs.

Even when the ideal diet for the older person is known and the country can economically produce it, a major problem will remain: the actual implementation of that diet. Older people often suffer the disabling effects of malnutrition as a result of a variety of problems peculiar—though not unique—to this group. Perhaps the most widespread of these problems is the need to scrimp on expenditures for food because of insufficient income. As costs for other essentials inflate wildly, a frequent tactic of older persons on fixed incomes to make ends meet is to eat less.

But insufficient income is only one cause of malnutrition in the aged. As the President's 1970 Task Force on Aging stated, "The lonely older person who finds going to the store too great a burden; the older person who is nutritionally ignorant; the chronically ill older person unable to prepare a hot meal—all are part of the problem." In particular, poor eating habits can be induced by psychological conditions such as loneliness, grief, apathy, and confusion. Fear of crime keeps some older people from going to the grocery store. Finally, many older people are unable to accommodate special dietary needs stemming from chronic diseases or medication.

Dietary habits can change; historically they have changed, at times with surprising rapidity. However, much more must be known about the economic, behavioral, and social factors that influence food intake before the nation can be confident that a good, easily available diet will actually be eaten. The NIA proposes to incorporate research on factors influencing nutritional practice and diet selection in the aged into its nutrition program. Mechanisms for satiety and hunger and problems of oral health would also be studied. Such studies would range from human physiology to behavior and sociology. A large proportion of those who survive to middle and old age suffer from such chronic diseases as atherosclerosis, hypertension, cancer, osteoporosis, diabetes, and senile dementia. The significant role of diet as a factor in the emergence of these diseases has been well documented. Evidence suggests that intake, or lack of intake, of saturated fat, cholesterol, calcium, trace minerals, and fiber are all related in some way to these disorders. The results of clinical research on changes in the digestion and assimilation of these nutrients may provide keys to understanding the etiology and improving the treatment of these diseases.

Some animals are susceptible to chronic disorders, such as high blood fats, obesity, and atherosclerosis, with aging while others are not. The reasons for these differences need to be explored, since they should contribute to our understanding of comparable susceptibilities in man. The NIA, in collaboration or coordination with other NIH Institutes, particularly NICHD, plans to increase its research emphasis on determination of the interrelationships between dietary intake, nutritional status, and late-occurring diseases. Examples of the great potential impact of the results of such research are legion.

Coronary heart disease is currently the leading cause of death in the U.S. Cross-sectional studies have demonstrated a large effect of age on serum lipids with highest average values in the middle years and lower values in the young and old. There is also evidence that with age the population of cells involved in arteriosclerosis is changed from normal growth patterns and functions, and that these changes may be age-related. A longitudinal analysis of serum cholesterol values at all levels, correlated with dietary histories, measures of obesity, and estimates of glucose tolerance, is needed to determine how these variables interact in the development of arteriosclerosis.

The Baltimore Longitudinal Study of human aging conducted by the NIA has been evaluating serum cholesterol and triglyceride levels in male volunteers since 1963. These data need to be analyzed and the research expanded. Studies are also needed on how aging at the cellular and molecular levels contributes



to cholesterol levels and metabolism, and how nutrition impacts on cellular aging as it relates to vascular disease. These studies would be closely coordinated with the National Heart, Lung, and Blood Institute's research program on arteriosclerosis.

To the extent that nutritional factors play a part in the development of hypertension, modification of the diet (such as restriction of sodium) would be an important preventive measure. However, before this would be accepted by the general population, strong scientific evidence for its beneficial effects would be necessary. At present, that evidence is not available.

Interrelations of nutritional factors, body composition, sodium intake, and aging in the development of hypertension need to be evaluated on a longitudinal basis throughout the human adult age span and on experimental animals. Contributing factors to the relationships between hypertension, aging, and nutrition at cellular levels must be understood if preventive measures are to be developed in the future.

As part of its longitudinal study, NIA has measured 24-hour urine-sodium excretion under steady state conditions. This provides a valid estimate of sodium intake. Dietary diaries, measures of obesity, and blood pressure measurements of these volunteers are also available for analysis of how these factors affect blood pressure. The NIA intends to expand its research on the relationship between nutritional variables, age, and hypertension in both human populations and experimental systems. The NIA would coordinate this research with the NHLBI Hypertension research program through established contacts.

Many cancers are age-correlated in manifestation. Some or most of them may be directly related to the aging process, either at the cellular level, at the susceptible tissue site, or consequent to aging changes in immune response to neoplastic cells. Such changes in cells and tissues, including the immune system, may be modifiable through nutrition.

An important research question is whether—or how—changes in nutritional requirements and/or utilization of aging normal cells are related or contribute to neoplastic change. Coordination with the National Cancer Institute on this subject is ongoing.

Osteoporosis is a skeletal disease characterized by decreases in the amount and strength of bone tissue. The reduction of mass and density of affected bones makes them weak and "porous," and therefore more susceptible to fracture, even under normal mechanical stress in some severe cases. Recent surveys indicate that osteoporosis is more widespread than arthritis and about three times as common as diabetes. These surveys suggest that approximately 25 to 30 percent of women and 15 to 20 percent of men over the age of 50 have osteoporosis severe enough to involve vertebral compression. The disease may begin as early as in the mid-30's and take a progressive and increasingly destructive course, with fractures of the spine and sometimes of the ribs.

Although osteoporosis is thought to result from a combination of factors, chief among these causes are hormones and nutrition. Dr. Donald Whedon, Director of the National Institute of Arthritis, Metabolism, and Digestive Diseases (NIAMDD) has stated that among the most important measures for preventing osteoporosis are a sufficient calcium intake, a diet adequate in protein and other nutrients, and possible treatment with vitamins or other nutritional supplements. In support of this recommendation, Dr. Whedon cited research findings comparing osteoporotic patients with patients of the same age who did not have the disease. These findings suggests that persons with osteoporosis tend to have a lower calcium intake. The osteoporotic human skeleton appears to be unusually sensitive to the calcium-phosphorous relationship in the diet. Therapy with fluoride, calcium and Vitamin D has been shown to increase the mineral content of bone in patients with osteoporosis. In NIAMDD studies of persons with severe osteoporosis, about three-fourths of the patients showed improved storage of calcium as its intake was increased—for instance by drinking more milk. In light of the real or potential threat of this disease to millions of persons over 40 throughout the world, the importance of improved diet at all stages of life in preventing disability is clear.

Osteoporosis, however, is only one of the bone disorders that affect older people. NIA research in the physiologic changes with age in bone and connective tissue will explore several questions: (1) Can the degenerative changes in these tissues be delayed or reversed through the administration of supplements such as calcium, phosphorous, fluoride, or Vitamin D? (2) Are there diet related hormonal controls (especially in post-menopausal women) which will protect



against bone loss? (3) What is the relationship of nutrient intake to various levels of physical activity in the elderly? (4) Are dietary protein levels modifiable to enhance bone calcium retention? Such questions will be discussed in an NIAMDD-led workshop on osteoporosis scheduled for February 1978. The NIA and NIAMDD have been coordinating extensively in planning this conference.

Distinguishing between normal and abnormal alterations in carbohydrate metabolism associated with age, obesity, and diet will provide the basis for understanding and treating late-onset diabetes. As one example of the difficulty older people have in assimilating nutrients, half of all normal subjects over the age of 65 would be considered "chemical diabetics" if their performances on a glucose tolerance test were to be judged by standards derived from tests on young individuals. Whether or not this decline in glucose tolerance represents the true disease, with measurable effects on the morbidity and/or mortality of the subjects, is important in understanding the pathogenesis of diabetes and in differentiating the disease from normal physiologic change.

The research being conducted by the NIA involves the longitudinal study of a group of men for their entire lives. Glucose tolerance tests have been done on these men and a prospective follow-up of their morbidity and mortality will allow further evaluation of their performance. Nutritional histories, activity histories, anthropometric measurements of obesity, and serum chemistries are also obtained. In combination with studies which define the relationships between glucose and insulin, these data will help elucidate the mechanisms responsible for a decline in glucose metabolism with age, diabetes, and obesity. The NIA plans to support further research important to understanding the role of diet in the development and treatment of diabetes.

One of the major impacts of diet in old age is its effect on cerebral functioning, mood and behavior. Research on this topic is just beginning, but it holds the promise of important discoveries in the future. For example, malnutrition and associated anemia are two of the primary causes of reversible brain syndromes. Reversible brain syndromes are characterized by fluctuating levels of awareness, which may vary from mild confusion to stupor or active delirium. The patient is typically disoriented, mistaking one person for another, and may have other intellectual functions impaired as well. These and other symptoms mimic those of chronic and irreversible brain syndromes and may therefore be misdiagnosed as such and left untreated. If handled as the true medical emergencies they are, reversible brain syndromes often respond well to treatment. However, untreated reversible brain syndromes can quickly become chronic and irreversible. The personal anguish and the costs of unnecessary institutionalization are severe for those whose reversible brain syndromes are not correctly diagnosed and promptly treated.

It is also necessary to learn whether there are patterns of nutrient intake or supplementation which are associated with decline in neurophysiological and/or behavioral functions, especially cognitive function. Decline of motor and cognitive abilities removes people from the mainstream of work and life. Enhancing professional, technical, and interpersonal competence by appropriate nutritional adjustment would not only be rewarding to the individuals, but would relieve society of some pressure on its health support systems. The NIA therefore places a high priority on studies of nutrition as it relates to central nervous system function and physiological performance. Plans for such studies are being coordinated with the National Institute of Mental Health and the National Institute of Neurological and Communicative Disorders and Stroke.

In order to communicate NIA's interests in the research program just described to the scientific community, the Institute's Extramural and Collaborative Research Program issued a Request for Applications (RFA) on nutrition in the NIH Guide to Grants and Contracts. This RFA is intended to encourage the submission of research grant proposals aimed at the study of the effects of nutrition on the health and well-being of the aged, as well as on basic processes of aging. Priority areas are identified as:

(1) Nutritional status and requirements of the aged, particularly the influence of therapeutic measures on nutritional status, i.e., vitamins, amino acids, etc.;

(2) The effects of social, psychological and economic factors on dietary intake;

(3) The effects of dietary modification on health, longevity, pathologic processes and physiologic responses, particularly changes in the immune and endocrine systems with age;

(4) Nutrition and changes in cellular structure and function with age; and

(5) Identification and characterization of specific models for research on nutrition and aging.



The RFA indicates that support is not limited to the areas listed. It is hoped that submitted proposals will relate to other areas such as membrane phenomena, problems of absorption across the gut, and relationships between nutrition and central nervous system functions.

In addition to the strategy discussed above, NIA will promote program development by sponsoring a major conference-workshop in early 1978 entitled "Nutrient Utilization and Nutritional Status of the Elderly." The purpose of this meeting is to:

- (1) Determine what is known about dietary intake, nutrient utilization, and their relationship to the health status of the aged.

- (2) Identify specific areas where additional clinical and basic research is needed to increase knowledge on the influence of dietary intake, nutrient utilization and nutritional status to improve and maintain optimal health in the aged.

- (3) Identify shared areas of interest with other NIH Institutes, including the need to cooperate or collaborate on ongoing or planned research in these areas.

The current NIA nutrition research program (fiscal year 1977 estimate) totals \$1.3 million. Fiscal projections of NIA support for research in clinical nutrition and aging can only be estimated in the broadest possible terms. However, it is anticipated that substantial interest and resulting proposals from the scientific community will be stimulated by both the RFA and the planned Nutrition-Aging Workshop/Conference. Only those proposals received by the November 1, 1977 closing date, however, will be eligible for funding in fiscal year 1978. As a result, only a modest increase in requests for extramural and collaborative support for the field can be expected in this next fiscal year. After that initial lag, with continued staff effort to communicate our priorities to the scientific community, we expect a more vigorous acceleration of scientific interest. By fiscal year 1982, the NIA Extramural and Collaborative Research Program should more than quadruple its holdings of requests for support for clinical research on nutrition.

The anticipated interest, however, assumes the existence of a sufficient base of research manpower and funds to carry out the expanded research program.

The development of this base involves serious issues of research training policy and funding. The NIA is not now supporting any manpower development in the area of clinical nutrition and aging through its training grant and research career development mechanisms. Because efforts to intensify support in the field are just beginning, it is difficult to estimate the size of the present manpower pool equipped to perform the kinds of research we have identified as high priority. An evaluation study is planned to help identify the extent of these manpower resources.

However, the NIA is actively planning its strategy for training grant, post-doctoral fellowship and research career development support in nutrition research training. In addition to publicly stressing our research priority in this area, which will encourage new investigators to seek postdoctoral training in nutrition-aging related areas, the NIA plans an announcement specifically aimed at encouraging the development of advanced research training projects in the areas of biomedical and behavioral research pertinent to the proposed NIA program on clinical nutrition. This announcement will be issued in the near future.

In addition to the impact of research and training for research, improved nutrition for the aged will depend upon the efforts of physicians and other health professionals better trained in both nutrition and geriatrics than they presently are. With additional training, nurses could be much more instrumental in the nutritional education of older patients. The NIA is exerting great efforts to improve the teaching of geriatric medicine and to transfer relevant research findings to health care providers as soon as they are available. Methods of more rapid transfer of knowledge from NIA to information and referral services, such as those of the Area Agencies on Aging and State Offices on Aging, are being developed by the NIA to accomplish its goal of timely professional education.

In a related effort, the NIA is working on consensus guidelines for diagnosis and treatment of reversible organic brain syndromes. These guidelines will have a nutritional component and will impact on the activities of private practitioners and Community Mental Health Centers nationwide.

The Nutrition Program for the Elderly Act, Title VII of the Older Americans Act, makes possible low-cost nutritious meals at conveniently located settings for older people. In this program, older people are defined as 60 years and above. New knowledge about nutritional requirements for older people, more accurate recommended daily allowances and foodstuff balance, could have an enormous



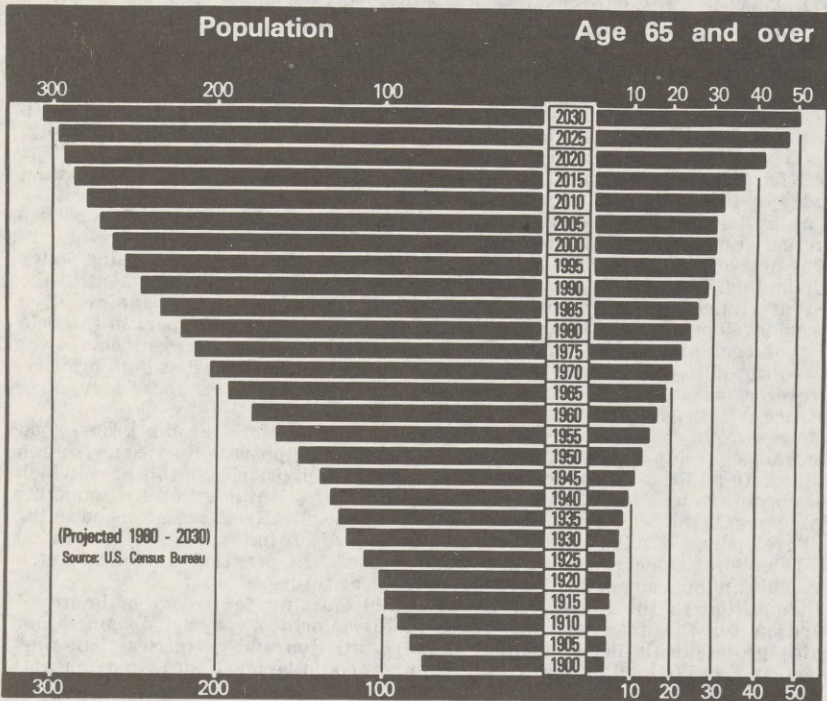
impact on the quality and benefit of these meals, as well as those of other large meal programs, such as those in hospitals and nursing homes.

A recent survey of 1,000 persons over 60 years of age in a rural county of New York State found that almost one-quarter of the participants were following a special diet for a medical reason. Of this number, 35 percent had questions about their diet.

A recent study in New York City found that in a sample of 308 patients being cared for by home health agencies, only 10 percent had no problems related to diet. Yet few agencies have the services of a nutritionist to help staff identify and deal with their clients' nutritional needs. Nor does Medicare reimburse for home visits by a dietitian or nutritionist despite many recommendations, including those of the 1971 White House Conference on Aging.

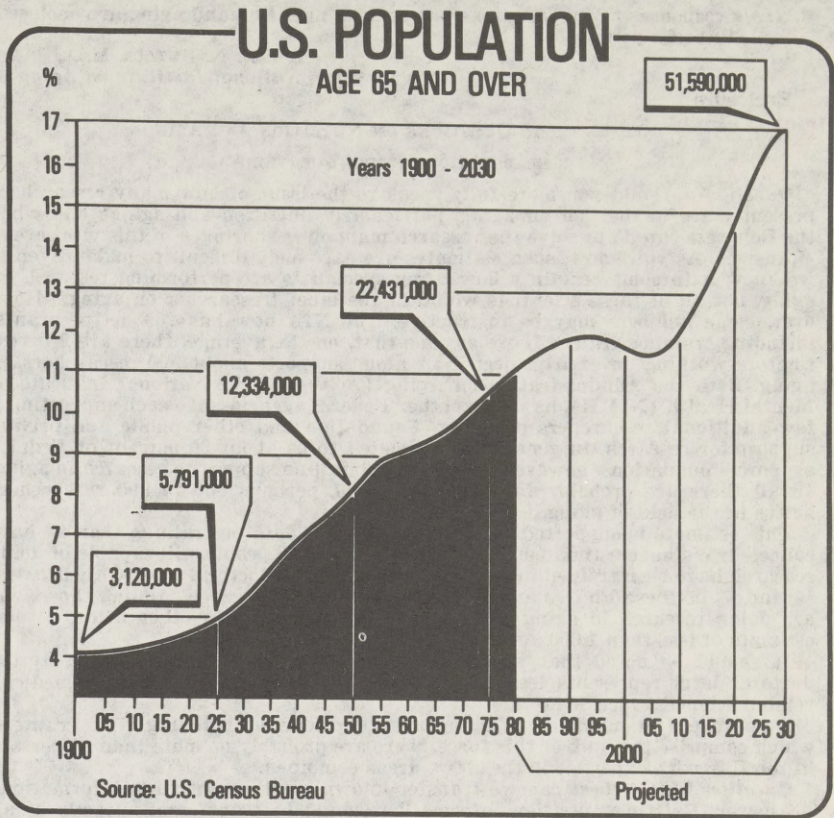
In conclusion, although the number of individuals over the age of 60 is increasing rapidly, information regarding their nutrient needs, nutrient intakes, and related factors is seriously lacking. The NIA has made research on this subject a matter of immediate priority.

I will be pleased to answer any questions you may have.



**GROWTH CHART** — Bars show the number of persons age 65 and older compared with total population from 1900. The chart extends to the year 2030.





**AGE GAUGE** — Chart shows the percentage of the American population 65 and older from 1900 to 1975, with predictions for 1980 to 2030.

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE,  
PUBLIC HEALTH SERVICE,  
NATIONAL INSTITUTES OF HEALTH,  
Bethesda, Md., November 11, 1977.

Hon. GEORGE MCGOVERN,  
Chairman, Select Committee on Nutrition and Human Needs, U.S. Senate,  
Washington, D.C.

DEAR MR. CHAIRMAN: I greatly appreciate the opportunity the hearing *Nutrition: Aging and the Elderly* gave me to discuss the vital issues connected with that topic. I am also pleased that, as your October 4 letter suggested, our testimony proved to be of some value to you.

The National Institute on Aging (NIA) has particular concern for the special needs and problems of the rural elderly. The Institute has placed a high priority on epidemiological and demographic studies to determine the health status and needs of this population.

We are continually reviewing the major programs and legislation relating to the rural elderly, such as the rural health initiative, in order to advocate needed improvements and identify needs for further research.

We have also initiated discussions with agencies which have direct responsibility for providing health services to our older citizens, with the aim of expanding the Government's efforts in rural areas. Your interest in and suggestions about this topic will be invaluable to us as we expand these efforts.



NIA's responses to the questions you sent on nutrition and aging are enclosed.  
Sincerely yours,

ROBERT N. BUTLER, M.D.,  
*Director, National Institute on Aging.*

Enclosure.

## RESPONSES TO QUESTIONS ON NUTRITION AND AGING

### I. ELABORATION OF KEY QUESTIONS

*Question a.* Could you more fully speak to the issue of how many researchers presently are in the field of aging, particularly nutrition and aging; and what the Congress can do to solve the research manpower shortages in this vital area?

Answer. As you know, such estimates are extremely difficult to make. Even if we knew with some certainty how many specialists are performing research on aging, not all of these scientists would fit the label "researcher on aging." However, some numbers may be instructive. The NIA now has 269 active grants, including training grants. If we assume that, on the average, there are 2 investigators working on each project, NIA alone supports about 500 researchers on aging. Both the Administration on Aging (AoA) and the National Institute of Mental Health (NIMH), as well as other Federal agencies, are each supporting a few additional researchers on aging. Foundation and other public and private support for research, in general, is estimated to be about 30 percent of Federal support. Foundations, however, have given almost no support to research in aging. In all there are probably far less than 1,000, perhaps 800 to 900 researchers active in the field of aging.

This estimate is supported by some preliminary data on training that we have collected. We have estimated that no more than 1,500 people still capable of doing research have been trained in the field of aging at the doctoral level. Only between  $\frac{1}{2}$  and  $\frac{2}{3}$  of these Ph.D.'s are likely to be active in research. Adding those who are doing research in aging but received their training in other fields, a total estimate of less than 1,000 active researchers seems realistic.

It should be noted that this estimate of scientists trained in aging at the doctoral level represents less than 1 percent of the local level in biomedical-related sciences since 1940.

Researchers in nutrition in aging are very scarce. Including NIA grantees, which comprise the bulk of this force, there are probably no more than 20 persons in the U.S. with expertise in these two areas combined.

*Question b.* How best can we transfer known existing nutrition information?

Answer. Existing nutrition information should be transferred directly to all parties who need it, including the public, health providers and educators and administrators of nutrition programs. Regarding information on nutrition and aging, whatever is known should be communicated to persons responsible for social dining programs through the auspices of the Title VII program of the Older Americans Act. The NIA, for example, is planning to develop several practical information pamphlets on such subjects as nutrition, prevention and self care. (The latter is already in press). Such pamphlets will get widespread distribution including such innovative arrangements as supermarket information centers. In particular, the NIA Information Office is planning two publications, one for laymen and one for professionals, as a result of the upcoming NIA Conference on "Nutrient Utilization and Nutritional Status of the Elderly."

*Question c.* With more time to examine this very difficult, but all-important question, can you give us a guesstimate of the reduction in health care costs which might result from improved nutrition among the elderly; and specifically, can you cite those illnesses listed on pages 73 and 74 in the "Dietary Goals for the U.S." report, which would be most affected if the health of older Americans was improved through a better diet?

Answer. Such a "guesstimate" could be developed, but only as a result of much careful research into the origins of health care costs for the aged and the impact on these costs of improved health. Many HEW components would need to contribute to such a study.

Most of the conditions listed in the report "Dietary Goals for the U.S." are likely to be affected by improving nutrition in the elderly. Probably, such improved nutrition would have its greatest effect on reducing death, disability, and costs related to heart and vascular disease, diabetes, osteoporosis, digestive disease, cancer and certain brain syndromes or "senile" states.



## II. SENILITY AND MENTAL HEALTH

*Question a.* You have said that malnutrition and associated anemia are two of the primary causes of reversible brain syndromes. Could you more clearly define the term "reversible brain syndromes" and does senility fit into that definition?

*Answer.* Reversible brain syndrome (RBS) is a brain pathology which may have one or more of several causes and exhibits a variety of symptoms, but which can be reversed spontaneously but, more important and now usually, by active care—when available. A sign of reversible brain syndrome is a fluctuating level of awareness, which may vary from mild confusion to stupor or active delirium. The patient may have hallucinations (particularly visual) and/or delusions of persecution. He or she may be disoriented and lose memory and other intellectual functions. Behaviorally, the person may appear restless, aggressive, frightened, dazed, anxious, uncooperative, sometimes as a result of his or her disorientation or hallucinations. RBS can result from as you have noted malnutrition and anemia, but also from congestive heart failure, infection, cerebrovascular accidents, drugs and other toxic substances, head trauma, and numerous other causes. Because these symptoms mimic common stereotypes of "senility" and resemble chronic brain syndromes, persons with RBS are often considered untreatable and sent to long term care facilities when active hospital care and return to the community would be the appropriate course of treatment. Left untreated, RBS can result in permanent brain damage and thus cause chronic, irreversible disability.

*Question b.* I read in your publication—"Our Future Selves"—that 15 percent of all Americans who reach age 65 have some type of mental disorder, and that the number of elderly Americans with mental illness increases to 30 percent by age 80. By how much could we reduce that number through better nutrition and preventive care?

*Answer.* Some decrease of mental illness would undoubtedly accompany improved nutrition in the elderly. However, we need, and urge the support of, epidemiologic studies to determine the incidence and prevalence of various mental disorders and of other research to identify the causes and cures of such diseases. Only given the results of these studies can an estimate of a percentage reduction in mental illness among the elderly be more than a wild guess.

## III. INDIANS, MIGRANTS AND OTHER MINORITIES

*Question.* You have emphasized that the aging process begins at conception. Likewise, you have cited the arbitrary nature of age 65 as the threshold of being categorized as elderly.

But what about those people, particularly migrants and Indians, who never see age 65. How do we define elderly for them, and what should the government do to provide them with the benefits available to those who reach 60 or 65?

*Answer.* Particularly because of the needs you have noted among the Indian, migrant, and minority populations, the government should tie income maintenance, Medicare and other essential assistance programs to need and measure of functional disability rather than chronological age.

## IV. MAYER'S NUTRITION INSTITUTE

*Question.* This summer in the Agriculture Appropriations Bill, Congress provided money to be used to plan a national center to be located at Tufts University under the direction of Dr. Jean Mayer, which will focus on the role of normal human nutrition in the aging process. This program would be funded under the Department of Agriculture and marks a definite expansion of human nutrition research within that Department. Congress, of course, does not want to duplicate on-going efforts in human nutrition research within the Department of Health, Education, and Welfare.

What recommendations could you make about how we could best insure that your research programs and those of this new institute are coordinated and complementary?

*Answer.* As you probably know, the Food and Agriculture Act of 1977 (P.L. 95-113) directs the Secretaries of DHEW and USDA to establish jointly procedures for coordinating nutrition research "in areas of mutual interest." The NIA would expect to give any such procedures its fullest support.



## V. NUTRITION LABELING

*Question.* Would comprehensive nutrition labeling, including full ingredient disclosure, be of particular assistance to the elderly?

*Answer.* Definitely yes. It would even be more useful if printed in large type and, where appropriate, in Spanish. Thank you very much.

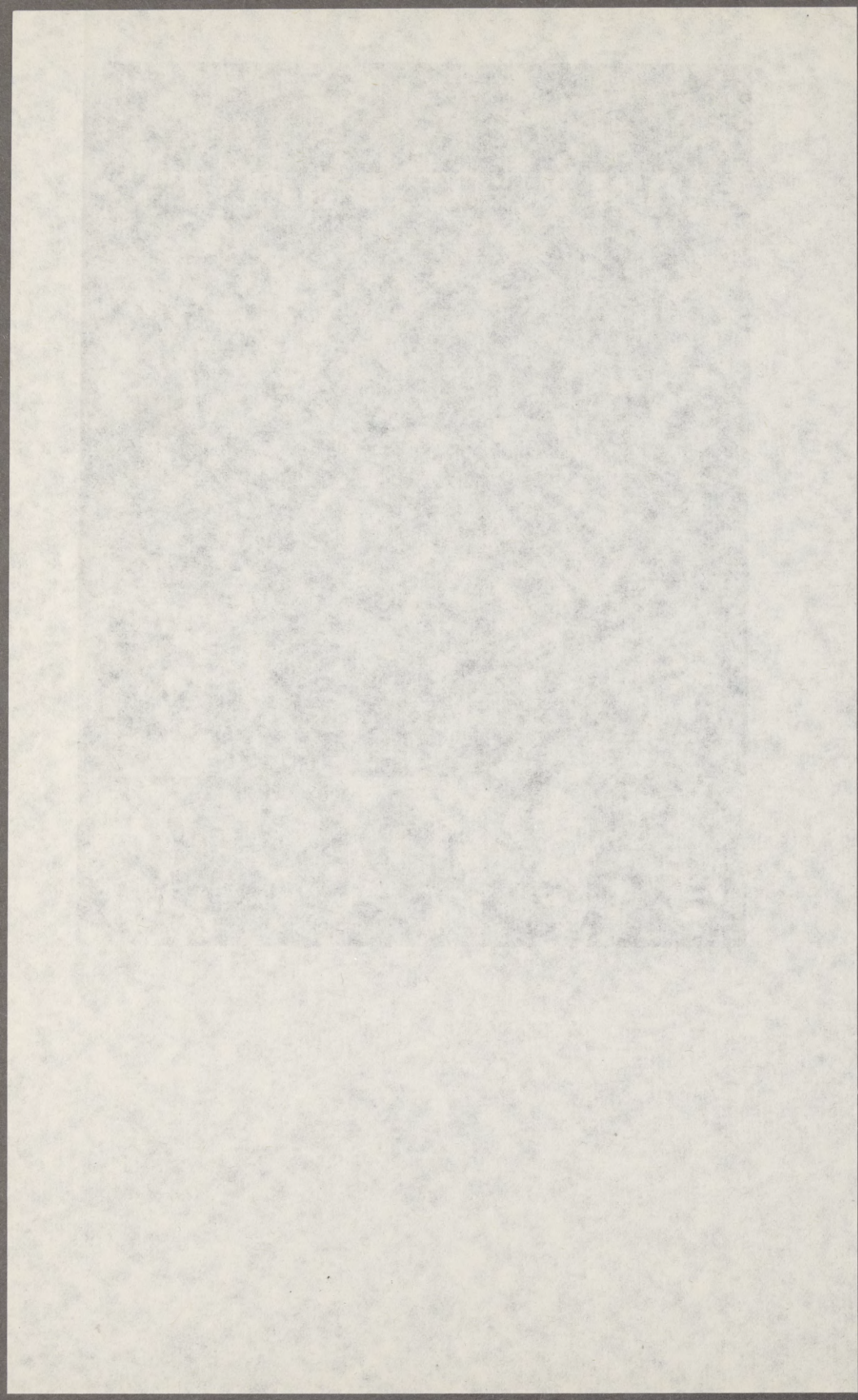


# OUR FUTURE SELVES

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE   Public Health Service   National Institutes of Health









O U R F U T U R E S E L V E S

A R E S E A R C H P L A N

T O W A R D U N D E R S T A N D I N G A G I N G

of the

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE

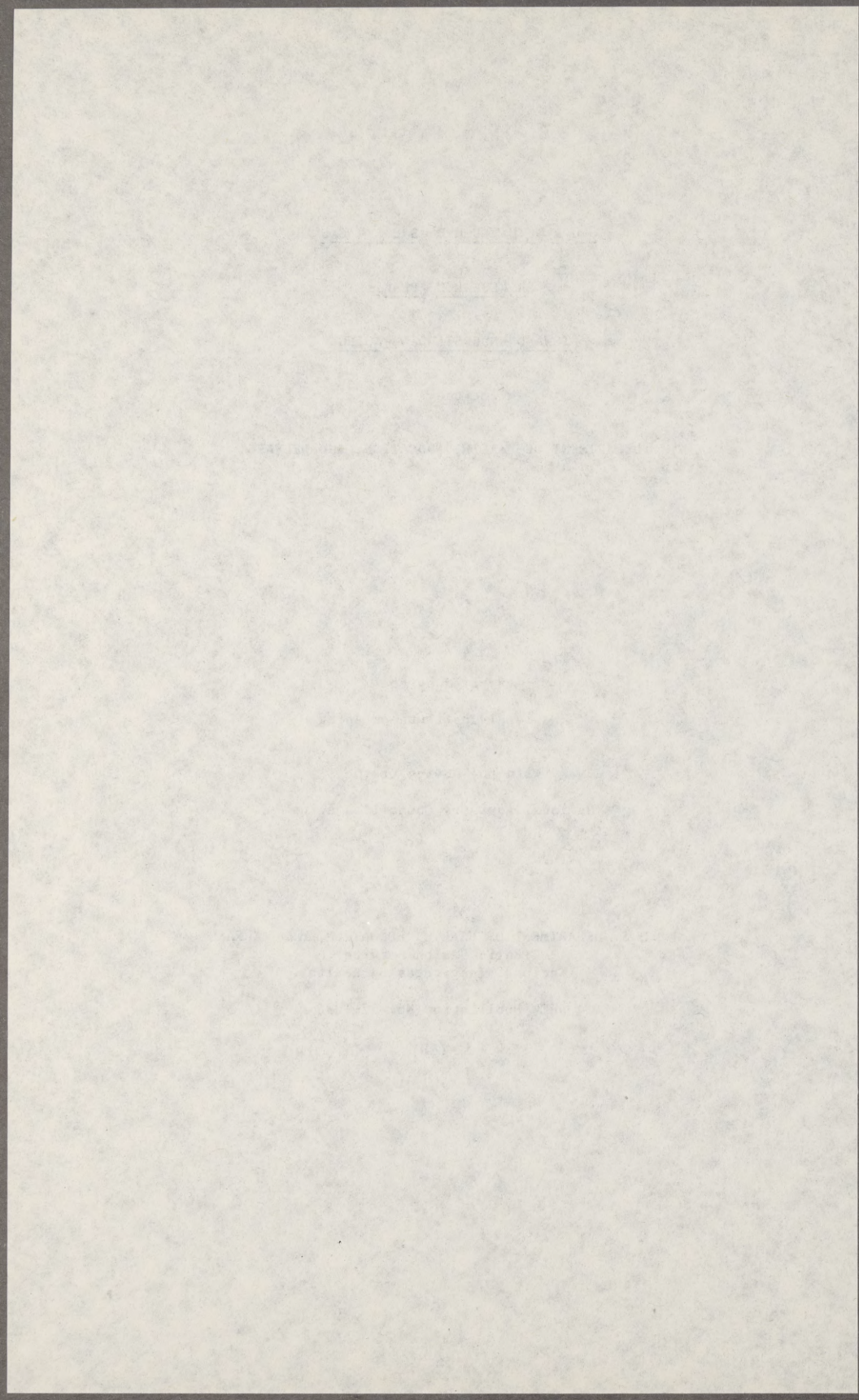
Prepared by the  
National Institute on Aging

With the Advice of the  
National Advisory Council on Aging

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE  
Public Health Service  
National Institutes of Health

DHEW Publication No. 77-1096







## P R E F A C E

Our social, economic, health, research, and other vital institutions and arrangements were not prepared for the "demographic revolution"--the dramatically rising numbers of people, and especially older people, that came with the twentieth century. Thus, the human triumph marked by increasing life expectancy contained potential and actual tragedies for all too many older people and their families. And, unless these same institutions and arrangements are not perfected in the next decades, the possibilities for personal tragedies--and social disturbances--will expand as the absolute numbers and relative proportions of the population over 65 attain new heights at approximately 2020 A.D.

However, what if our nation--and collectively other nations--take the demographic achievement still further and extend the vigor and productivity of older people? What if the nature and the duration of the dependency and frailty of old age are altered and decreased through fundamental biomedical and behavioral research? Then we will be confronted, not with older people as we presently know them and old age as we presently know it, but an entirely new situation, some evidences of which we are beginning to see in the active and activistic, lively and resourceful older people of today. From that angle, research is concerned with what old age will become as we eliminate disease, disability, and social adversity. Of course, research alone cannot accomplish the objective of a healthier and stronger older population, but without the fruits of research it is not likely that our social and economic institutions and arrangements can go far beyond palliation.

The quality, not alone the quantity, of life should be the quintessential goal of research as well as other human efforts--lest our future selves will be in jeopardy.



Through the accumulated knowledge and the generosity in time and effort of the National Advisory Council of the National Institute on Aging, the National Institute on Aging staff, and the broad community of gerontologists, we have the beginning formulations of a significant new research effort in America: the accompanying Research Plan. It is a reasonable and reasoned promise of a major endeavor to comprehend the nature of aging and its associated ills with the ultimate aspiration of a more decent and dignified old age.

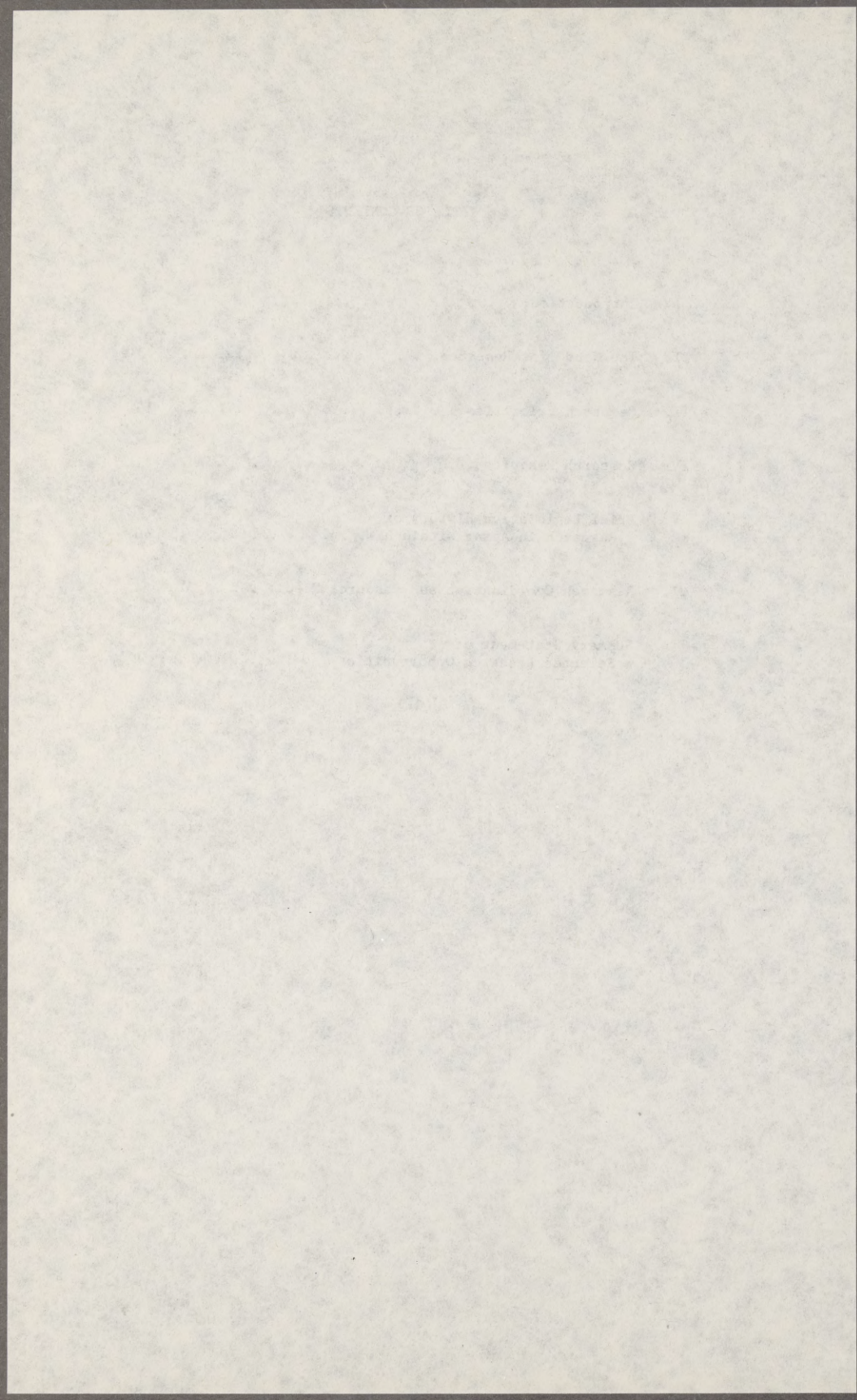
Robert N. Butler, M.D.  
Director  
National Institute on Aging



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## Chapter 1

### I N T R O D U C T I O N

"The Secretary . . . shall . . . develop a plan for a research program on aging designed to coordinate and promote research into the biological, medical, psychological, social, educational, and economic aspects of aging." 1/

This Nation's elderly hold up a distorted mirror to our society. The distortion is imposed by two elements: the vital supports which many of the elderly lose merely by the fact of having become aged; and our ignorance of what aging is--an ignorance made the more profound by our societal resistance to acknowledging the fact of aging and preparing adequately for it.

#### UNFULFILLED EXPECTATIONS

The normal supports available to much of our population but frequently unavailable to the aged include:

- o jobs and basic economic security
- o quality health care (physical and mental)
- o transportation
- o a full range of legal and other professional services
- o decent housing arrangements
- o protection from crime

Such supports are by and large not available to the aged. Despite inadequate income and savings, many have no job or at best only part-time work, and no ready surrogate for the loss of self-worth and esteem that accompanies an end to employment. The aged learn that the medical system that fits their needs in middle age is now out of phase, not structured--in manpower, institutional resources, payment

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1/ The Research on Aging Act of 1974, P.L. 93-296



mechanisms, or motivation--to deal with the chronic impairments and long-term illnesses that may now afflict them.

There is not sufficient psychiatric help or understanding to aid in coping with the wrenching changes and strains of old age--bereavement, loneliness, financial and social insecurities. Many aged persons find their financial resources meager and dwindling: most elderly couples and individuals have less than \$5,000 in assets and many less than \$1,000. The aged often learn that they can no longer easily get where they need to go, that their housing is inadequate, their pensions too little.

The effect on many of the elderly is to blunt the inherent values and joys of old age--a time to reflect on one's life, synthesizing experiences, passing on learned wisdom and philosophies to others, preparing for and understanding the coming of death. Rather than old age being a time to savor the final stages of human development, it often becomes a struggle to survive in what is perceived by many aged as an increasingly alien society. Perhaps most tragically, old age is lacking in a life-long sense of accomplishment and self-worth.

#### THE NATURE OF AGING

We do not know what aging is. Consequently, we cannot crisply separate the changes--social, behavioral, biological--intrinsic to aging, from those changes imposed by medical history, cultural and ethnic settings, the manner of a person's life, and other externals. Not knowing what aging really is or means, we generally rely on an arbitrary chronological division between middle-age and old age, usually set at 60 years. Commonly, a person passing this limit is conditioned to a uniform set of beliefs about aging and the aged: intellectual decline slipping into senility; inevitably, entry into an institution; and increased vulnerability to certain diseases and disorders--such as diabetes, atherosclerosis, arthritis, blindness, and dementia.

But these are pieces of a myth. Reaction times do slow with age, but most of the aged fully retain until they are very old, and often until their death, their ability to reason, their memory, their wit. The elderly sometimes seem lonely and withdrawn, but that may be the result of society withdrawing from them. The elderly commonly have decreased glucose tolerance, decreased creatinine clearances, and higher blood pressures, but not all are diabetic, have kidney disease, or are hypertensive. We associate the elderly--particularly the very



old--with institutions, but in fact, at any moment in time, only about 6 percent are there; the other 94 percent usually prefer to stay out, and generally can care quite well for themselves despite the fact that many suffer some chronic illness or impairment.

#### RESEARCH ON AGING

The implication for aging research that emerges from the preceding considerations is that to mount effective programs we must understand which changes with age are due to the normal process of aging itself and which are due to an individual's heredity, cultural setting, life style and so on. Therefore, in this research plan--most particularly, in the chapter on research priorities--two premises underlie the recommendations for research to be conducted by biomedical, behavioral, and social scientists:

- o effective programs for the aged--whether medical or social, treatment or prevention--must be based on knowing which changes in the aged are intrinsic to the aging process and which are not
- o if we are able to prevent or lessen the impact of non-intrinsic factors in the decline of the aged, then we are left with a unique and more satisfying concept of what aging is or should be--a natural stage in human development leading to a gradual and peaceful end

Basic studies on aging--biomedical, behavioral, and social--converge on the issue of designing services and delivering them: applying what we know so as to enable the aged to enjoy to the fullest a useful and active life span. Here, again, two interrelated premises apply:

- o existing services for the elderly are flawed, be they health-care delivery and compensation systems, community services inaccessible to the aged, or inadequate and sometimes unsympathetic mental health services
- o these shortcomings in existing services and delivery systems will become even more apparent as the average age of our population continues to rise, and as our population over 65 continues to increase in the coming decades



#### THE RESEARCH PLAN

Priorities for the three major areas of aging research--biomedical, behavioral and social science, and human services and their delivery--are described in Chapter III of this research plan for DHEW. Chapter IV outlines the required resources to address these priorities including trained research manpower, experimental resources such as human and animal populations, and access to validated data.

Demographic information that outlines the major issues affecting aging and the problems of the aged is given in Chapter II, while Chapter V gives a brief legislative history of research on aging within the DHEW. The sixth and final chapter gives very brief, and at this initial phase necessarily general, recommendations on future budget needs and means to approach a coordinated program among various DHEW units on aging and the problems of the aged.

#### THE NATIONAL ADVISORY COUNCIL ON AGING

The National Advisory Council on Aging of the National Institute on Aging was identified legislatively as the primary source of advice to the Secretary, DHEW, in developing this plan. And indeed the Council has done just that, displaying in the process remarkable enthusiasm, diligence, and generosity of time. The contents of Chapters III and IV, Research Priorities and Research Resources, respectively, are based directly on materials prepared and advice given by the National Advisory Council on Aging. Those materials--separate and detailed reports on the state of science and research priorities in the biomedical sciences, the behavioral and social sciences, and the developing science of human services and delivery systems--will be made available in the near future as companion volumes to the Research Plan.



## Chapter II

THE NEED FOR RESEARCH

"The Congress finds and declares that . . . the study of the aging process, the one biological condition common to all, has not received research support commensurate with its effects on the lives of every individual;" 1/

Long life expectancy is a decidedly modern achievement. At the turn of this century, four of every hundred persons living in the United States were age 65 or more. Now, only seventy-six years later, the proportion has more than doubled, and it is more than 10 of every hundred (Figure 1). Although this proportion is not expected to rise a great deal more in the next few decades, the absolute numbers of the aged will grow rapidly, and the projection is for about 30 million older persons by the year 2000. These changes in the age composition of our population lend increasing urgency to the need for reply to such critical questions as: How does our society meet the needs of older people? And, how does their increasing presence affect other groups in the society?

Nations prize longevity and regard it as an outstanding accomplishment when the majority of their citizens live to old age. Average life expectancy, or average age at death, may be regarded as one of the most important indices of social health and overall quality of life within a society. The problem this nation faces now is the lag that occurs in adapting its social institutions to the needs of older people at the same time that the needs of younger people are being met. In short, problems arise when a nation like the United States has not been prepared for the "sudden" appearance of large numbers of older people.

The aging society has brought with it a certain proportion of older persons who suffer from poverty, preventable illness, and social isolation. These persons, who can be termed the needy aged, create acute problems in the fields of social and health care. But broader issues stem from the needs of all individuals to adjust to the new rhythms of life that come

1/ The Research on Aging Act of 1974, P.L. 93-296



The Percentage of Population Aged 65 and Older Has Increased

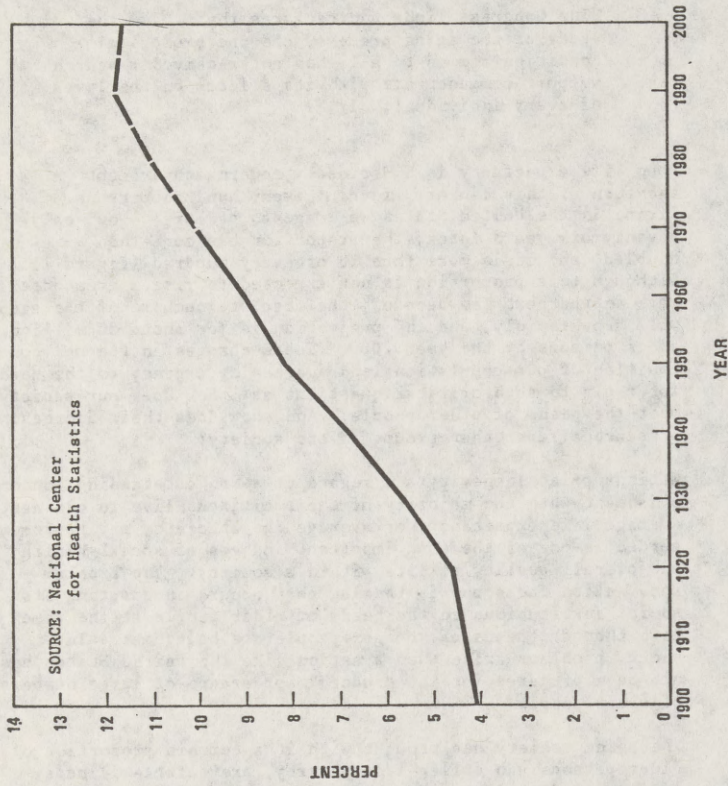


Figure 1.



with increased longevity: to new social phenomena such as multigenerational families, retirement, increased leisure, changing health status, and to the new opportunities and new problems of adaptation that accompany a long life. And for the society at large innumerable policy questions arise as the whole social fabric accommodates itself to the new phenomenon of the changing age distribution.

In over-simplified terms the American society in the 1970's faces two different sets of issues. On the one hand, there are increasing numbers of the "young-old," persons in their 60's and early 70's, who are relatively healthy and vigorous, a large number of whom are retired, who seek for meaningful ways to use their time, either in self-fulfillment or in community participation, and who represent a great resource of talent for society. On the other hand, there is an even more dramatic increase in the proportion of the elderly population which might be termed the "old-old." This comprises persons in their mid-70's, 80's and 90's, an increasing minority of whom remain vigorous and active, but a majority of whom need a wide range of supportive and restorative health services and social services (Figure 2).

For historical reasons, the old-old of the 1970's represent a disproportionately disadvantaged group. Many were immigrants who came to this country with little formal education; many worked most of their lives at low-skill occupations; many lost their occupational moorings during the Great Depression and did not recoup in the period of prosperity ushered in by World War II, nor did they build up sizable equities under the Social Security program as it developed during the 1940's and 1950's.

In succeeding decades, more and more older people will have been native-born, will have grown up in urban areas, will have had high school and college educations, will hopefully have been spared from widespread economic catastrophe, and will benefit from pension programs, social security, and government service programs of all types. Thus the persons growing old in the future will probably have very different characteristics from those who are presently old.

These different characteristics will in turn lead to vastly differing expectations, and as a consequence there is an urgent need to plan not only for those who are the present aged, but also for the future aged. The dimensions of the problem may be described in the following demographic terms:



- o between 1900 and 1970, there has been an enormous gain in life expectancy, a gain of some 20 years. However, the gain is due mainly to lower infant mortalities, rather than better health care for adults; thus, taking 1950 rather than 1900 for the base year, life expectancy at birth increased by only one and three years for men and women, respectively; and for men aged 65 in 1950, life expectancy actually decreased.
- o women live longer on the average than men; and the increase in life expectancy at birth since 1900 has been greater for women (25 years) than for men (20 years). For non-whites, these increases have been even more striking (35 years for women vs. 29 years for men).
- o present trends suggest that, barring major medical breakthroughs which might dramatically reduce death rates, further gains in life expectancy at birth will be relatively small. By the year 2000, there may be an increase in men of 1 to 2 years, and in women of perhaps 5 to 6 years.
- o the numbers of older persons will increase dramatically in the next few decades, even without any new biological discoveries and without any sudden jump in the length of the human life span. At present there are over 22 million persons aged 65+ in the United States. According to current projections the total will be over 30 million by the year 2000. Compared to their present 10.5 percent of the total population, they will then constitute about 11.5 percent.
- o while the increase in the aged population between 1970 and 2000 is not expected to be as dramatic as it was between 1940 and 1970--20 million to 30 million versus 9 million to 20 million--there will be another surge in the decade after 2000 when the post-war babies reach 65.
- o the numbers of old-old (75+) will grow at a more rapid rate than the young-old; and the ratio of women to men will increase even more. Thus, by the year 2000 the older population will be more heavily weighted toward the very old (Figure 2), and particularly toward very old women.



The Proportion of the Very Old Among the Elderly Is Increasing

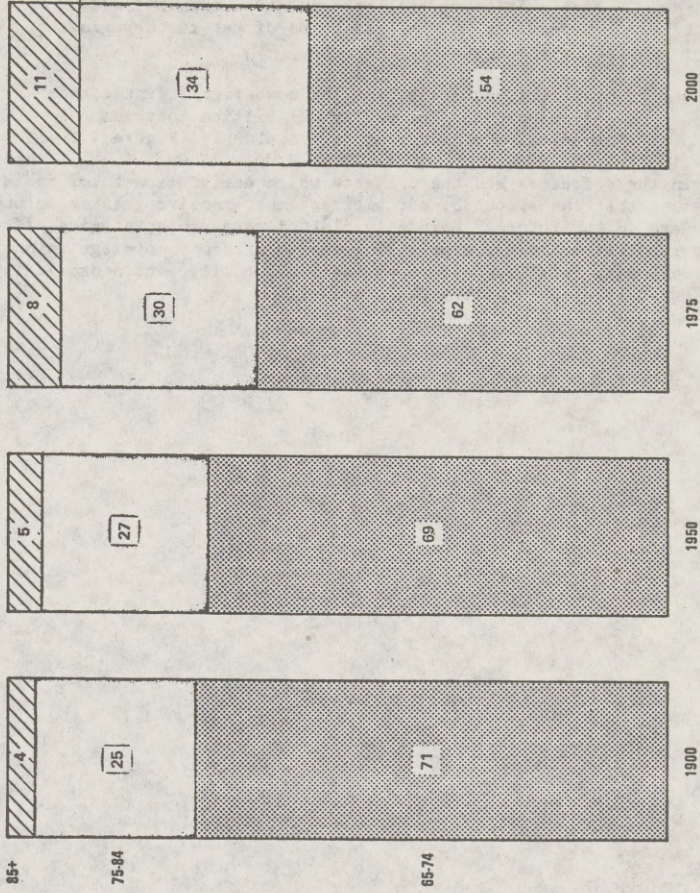
SOURCE: National Center  
for Health Statistics

Figure 2.



- o expenditures for medical care for the elderly more than tripled between 1966 and 1974 (Figure 3). A continuation of present population trends leads inescapably to the prediction of yet further growth of these costs.
- o public funds are by far the most significant source of support for the nearly \$27 billion costs of hospital care incurred by the elderly (Figure 4).

Given these factors and the projects which derive from them, it is obvious that the status of our citizens must receive greater scrutiny now and in the future. Carefully plotted research strategies offer the greatest promise for providing every citizen an old age which is as rewarding intellectually, physically, socially, and economically as our enlightened society can provide.



Expenditures for Medical Care for the Elderly  
Have More Than Tripled Since 1966

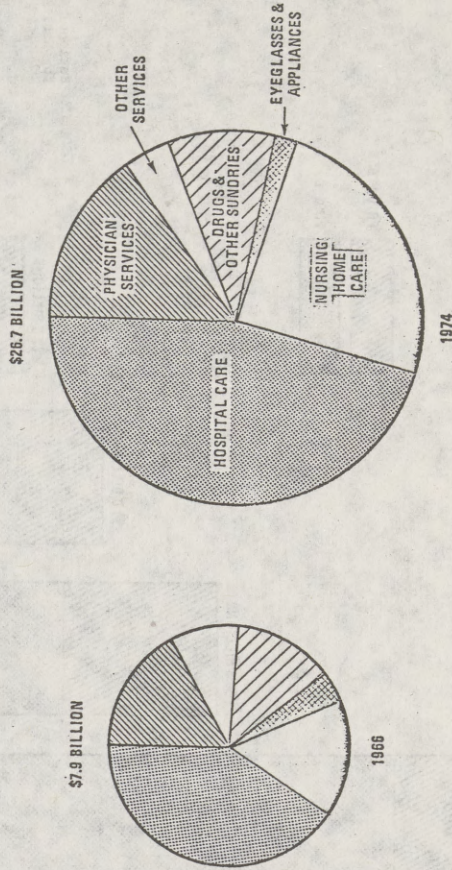


Figure 3.

SOURCE: National Center  
for Health Statistics



Public Funds Pay the Highest Proportion of Hospital Costs for the Elderly

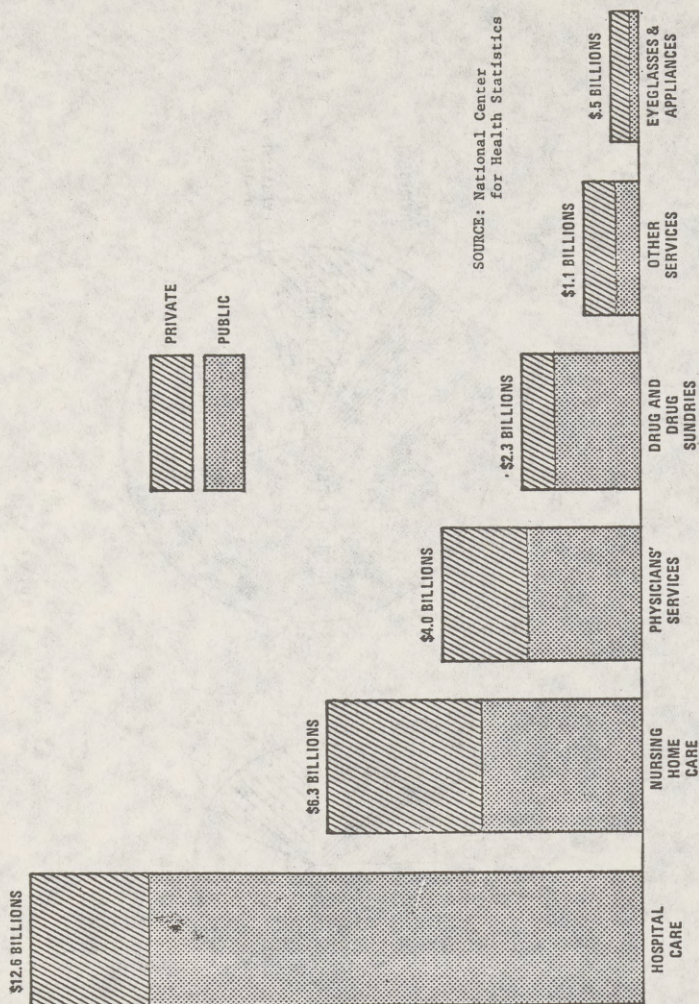


Figure 4.



## Chapter III

RESEARCH PRIORITIES

"The Congress finds and declares that. . .in addition to the physical infirmities resulting from advanced age, the economic, social, and psychological factors associated with aging operate to exclude millions of older Americans from the full life and the place in our society to which their years of service and experience entitle them." 1/

The Department of Health, Education, and Welfare, like other departments of the Government, is concerned with the well-being of society. Satisfying that concern becomes increasingly complex. For instance, the maintenance of health and often the effective treatment of illness requires a wide variety of social and health-supportive services in addition to medical skills.

Thus, mental and physical health depends to an increasing extent upon public programs of sanitation and hygiene; upon social policies that safeguard the physical environment against pollution and the depletion of essential resources; upon a variety of health delivery systems that include an emphasis on supportive services; upon equitable distribution of goods and services; and upon development of a human environment that reduces violent behavior, tensions, anxieties, and other social and psychological pathologies. Health also depends upon the willingness and the ability of individuals to care for themselves, and to apply the principles of preventive medicine by emphasizing in their lives those elements that foster health and the prevention of dependency and disability.

The interdependency of biological and social factors in effective health care is clearly apparent in efforts to understand and treat the problems of the aged. Appreciation of the position of the aged in our society and the effects of an increased proportion of older people on the entire society, requires emphasis on both biomedical and social research.

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1/ The Research on Aging Act of 1974, P.L. 93-296



## DIVISION OF RESEARCH PRIORITIES

The research priorities described in this chapter are given in three categories: the biomedical sciences, the behavioral and social sciences, and human services and their delivery. This division is somewhat artificial but still necessary. It is artificial because to divide priorities by areas belies the truism that the problems of aging and the aged are immensely complex, not readily divisible, requiring a holistic, comprehensive, and systematic approach.

however, the difficulties inherent in research on aging and the aged also make it clear that a single approach will at the very least lead to frustrations and disappointments and at the worst to failures in significantly advancing our knowledge. What is required is a well-planned and carefully coordinated application of the pertinent scientific disciplines--genetics, biochemistry, epidemiology, demography, sociology, psychology, anthropology, economics, political science, and others. With this discipline-oriented approach, the methods of many sciences can be applied to a common problem and a cadre of highly-trained researchers created, having as its central focus the problems of aging and the aged.

As in other fields of research, when new hypotheses on the process of aging are presented, the methodology needed to test them may not be available. Or where there is applicable methodology, there may be inadequate data. The encouragement of highly-competent researchers trained in specific disciplines can stimulate the flow of good ideas and hypotheses, enrich the methodology, and enlarge the stock of validated data.

An obvious goal of this intensified and concerted research effort is to foster the health and vigor of a growing segment of the American population. But what we learn from this effort will ultimately benefit the entire population. For if we can identify the factors that so enormously increase the risk of coronary thrombosis among the aged, we can also identify those factors that are preventable and then design suitable programs; if we can find better ways to deliver health care to the aged, the lessons learned may be applied to the delivery of effective and economic health care to the society-at-large.



## BIOMEDICAL RESEARCH

Basic and clinical biomedical research can improve the quality of life for the aged (e.g., by relieving many of their painful disabilities), enable more people to fully realize their natural life span, and guide the creation of effective health-care services.

To approach these goals, we must be able to distinguish aging from disease. The elderly ill--and usually their families and physicians--commonly attribute many of their symptoms to aging and therefore regard them as immutable when their illnesses may in fact be treatable. Cancer, stroke, painful and crippled joints, mental confusion, and heart disease are not the inevitable tolls of aging; rather, they are the results of a variety of causes not intrinsically related to age. Nor are normal physiological changes with age to be regarded as diagnostic signs of diseases such as hypertension and diabetes.

But aging is the result of a series of fundamental, if poorly understood, biological changes, and therefore aging can affect the course, symptoms, prognosis, and effectiveness of therapy of diseases and disabilities usual to the aged. For example, normal changes in the immune system with age determine a person's resistance to infection. We must delineate these and other effects of aging on the characteristics of disease to help guide therapy, assay its effectiveness, and to evaluate the effects of various diseases on the process of aging.

To distinguish aging from disease and to examine the effects of one upon the other, we need a clear description of the aging process at all levels of life: the genes, their structure, expression, and regulation; the various constituents of the cell, such as the mitochondrion and nucleus; the cell itself; organs and organ systems, such as the respiratory, nervous, and cardiovascular systems.

Without knowing what changes occur with age, we cannot find their causes. Nor can we reliably determine the normal range of physiological, structural, and other changes with age. Different systems of the body--endocrine, cardiovascular,



gastrointestinal, and so on--age at different rates that are determined to varying degrees by a person's genetic makeup and environment. These progressive changes modulate the characteristics of disabilities, diseases, and infirmities suffered by the aged, including arteriosclerosis (hardening of the arteries), many of the common forms of cancer, diabetes mellitus, osteoporosis (loss of bone mass), osteoarthritis (chronic degenerative joint diseases), benign prostatic hypertrophy (enlargement of the prostate gland), pulmonary emphysema, cataracts, depressive illnesses, and senile dementia (a form of mental deterioration).

These diseases--many the province of disease-oriented Institutes of the NIH--can be extremely powerful probes for understanding the aging process, since "nature nowhere so reveals her usual workings as when she deviates from her usual paths." The stance of the researcher on aging is to relate the nature and course of those diseases to genetically controlled changes with time in biological structures and functions. What is ultimately gained is an understanding of the interacting influences of genetics and environment in age-associated diseases as different as osteoporosis and senile dementia.

Clearly, biomedical research on aging has implications for virtually all the major ailments of man. By probing possible relationships between the aging process and the development of cancers common to the aged, we may better understand the causes and nature of other cancers; by identifying the factors leading to coronary thrombosis, we perhaps can design programs of prevention, not only for the aged, but also for those still young and in the midst of productive careers.

Biomedical research on aging can be divided into two broad categories: the mechanisms of aging and the interaction of aging with external influences. The first covers the gamut from molecular genetics to clinical aspects of disease in the elderly, while the second analyzes the influences on aging of diet and nutrition, drugs and their metabolism, and a variety of other chemical and physical factors. The approaches used for both categories range from the very fundamental to the applied, from the biology of aging cells to longitudinal studies of aging populations, from basic immunology to analyzing the response of the elderly to primary and secondary infections, from an analysis of cell structures to a study of the effects of different diets on resistance to diseases.



### Priorities

Against that background, a number of initial, highly selected research priorities can be emphasized:

#### The Cell--Structure, Biochemistry, Genetics, and Physiology

Cellular research related to aging has emphasized the identification and description of apparent cellular changes with age. While we now have a large and still growing list of such changes, we do not know which are related directly to the aging process and which are not. Fundamental cellular studies should help distinguish the significant changes and may answer essential questions, such as

- o the effects of experimental and natural changes on the various constituents of the cell, including their functioning, physiology, and structure
- o the causal relationships, if any, between the decline of the numbers of functional cells and the decline of the physiological functions of organs and organ systems
- o factors influencing the life span of cells

#### Normal Physiological Changes With Age

We have little quantitative and reliable information on physiological changes with age, particularly in those organ systems--cardiovascular, pulmonary, endocrine, and nervous--whose failures account for a large proportion of the mortalities and morbidities among the aged. Well conceived and executed investigations of normal physiological changes with age can

- o support the basic objective of aging research of extending the useful life span
- o establish physiological baselines by age to enable other NIH Institutes more effectively to probe various disease processes
- o assess the value of exercise in slowing the normal decline of physiological functions.



### Immunological Changes

The immune system is intimately related to the body's adaptation to environmental stress and change. Various normal immunological functions appear to decline with age. Associated with these declines--and perhaps causally related to them--is the increase with age of the incidence of immunologically related diseases such as various auto-immune diseases, cancer, and antigen-antibody diseases. Studies of the normal range of immune activity with age may lead to experimental programs on the restoration or slowing of declining immunological functions. In addition, answers may be provided to some provocative questions, including

- o what is the normal level of immune function for an aged person?
- o what role does the immune system have in the aging process?
- o why do the elderly respond differently--and often more poorly--to infections than the young?

### Clinical Diagnosis--Definition of Normal Standards by Age

Physiological changes with age obviously have an impact on the diseases of the aged. For example, diseases such as diabetes mellitus, tuberculosis, and bacterial endocarditis display different symptoms in the elderly than in the young or middle-aged; the pain typically associated with some illnesses--coronary thrombosis, intestinal obstructions, and acute appendicitis--may not be present or as obvious in the elderly.

Such changes in the presentation of illness, due in part to normal physiological changes, must be examined collaboratively by physiologists and clinicians. There is an absence, by and large, of physiological standards for the elderly. When measurements have been made, they have typically been made on men, despite the well-recognized and often major differences in many physiological functions between men and women. Consequently, considerably more research emphasis must be given to establishing normative information regarding aging women.



### Interaction of Aging and Disease

There is poor understanding of the interactions of the normal pathological and physiological changes of aging with various diseases. The result may be, as with maturity-onset diabetes, an inability to distinguish aging changes from disease processes. Or our lack of knowledge may make it difficult to prescribe therapy or to design preventative programs, as is the case with atherosclerosis, in which the factors that contribute to its incidence among the elderly have not been adequately studied.

### Organic Brain Disorders

Organic brain disorders are due to chemical or physical changes, and may be reversible or chronic. Although they occur most frequently among the elderly, efforts to find causes of organic brain disorders should help victims of all ages. We must also intensify our efforts to improve diagnostic tests and therapies, both being now inadequate.

### Changes in Nutrient Requirements and Metabolism with Age

There is no rational basis for nutritional recommendations for the elderly, an awkward fact since many public and private programs center on or include the delivery of nutritional services to the elderly. Moreover, diet may be a factor in producing certain diseases such as atherosclerosis, and in ameliorating others, such as diabetes.

We need fundamental information regarding changes in nutrient metabolism with age if we are to define the needs of the elderly, plan effective and economic nutritional programs, and use diet as one element in blunting the impact of physiological decline.

### BEHAVIORAL AND SOCIAL SCIENCE RESEARCH

For the next several decades, the United States--and other developed countries--will have an increasing population of the elderly, one in which females are predominant. The effectiveness of policies designed in response to these population changes will depend on how well we understand the aged, individually and as groups. Partial knowledge and false assumptions may lead to policies and legislation with unexpected, perhaps disappointing results.



The elderly are a diverse group, with individual differences often more telling than similarities. But to aid analysis, the aged population can be divided into the old and very old. The old are those as young as sixty, probably retired, usually healthy and vigorous, often anxious to apply their talents, knowledge, and time meaningfully, and therefore constituting a valuable if often unused resource. The very old are 75 years of age or older. Many in this group are vigorous and self-sufficient; others can manage their lives if given some support by health and social services; while a small number--but one that grows with age--need sustained support.

Even allowing for the division of the aged population into two groups, there is still the fact that the aged are a highly diverse population, not readily quantified or labeled. Also, there are not adequate theories to help us to understand the behavior of aging persons or groups. That is true whether the pertinent discipline is psychology, sociology, anthropology, economics, or political science.

However, the increased level of research on the aged beginning in the 1950s has led to several insights on which effective research programs can be based.

One such insight is that, in contrast to prevailing myth, most of the "normal" aged--70-75 percent of those over 65 years of age--are intellectually and socially able, productive (given the opportunity), mentally vigorous, interested in their surroundings, eager to participate in the social life of family, kin, and community. Where there are decrements and apparent declines, the cause is not necessarily the biological process of aging, but other, often controllable impositions only partially related to age--disease, social isolation, poor diet, limited education, economic plight. The inability of some aged persons to cope intellectually and socially is usually due to stresses associated with aging than caused by it. This view, that at least some declines are not inexorably bound to the normal pattern of human development, forces the conclusion that it is possible to prevent or treat many of the intellectual, social, and emotional problems of a significant proportion of the aged population. Moreover, it emphasizes the ability of many of the aged, given the opportunity, to lead independent, self-sustaining, satisfying lives.



That a substantial majority of the aged are indeed intellectually and socially competent is supported by the demonstrable fact that integration of the older person in the society is the norm rather than the exception in every society that has been carefully studied, including the United States. Institutionalization is limited to a small fraction of the aged. A significant number of the aged able to participate socially is excluded for a variety of reasons--apparent disability or illness, or a latent prejudice against any aged person.

How an aged person responds to stress--illness, deep grief, financial strains--is largely a function of the life lived and the experiences had. It has little to do with age or aging *per se*. Rather, the capacity to cope is dependent primarily on education, work patterns, family--all the elements that structured one's life, modulated it, and gave it meaning. And, a person's character--his or her individuality--remains intact until near if not to the very end of life.

The fact that individuality is maintained into very old age requires that programs for the elderly, to be effective, must provide a wide range of options--in education, in work and leisure, in housing and living arrangements, in social and health services. Pervading these policy considerations is the fact, established by social research, that all modern developed societies have the wherewithal, even with shifting proportions of workers and retirees, to maintain adequate income for the elderly and finance essential services for those who need them. The willingness to do these things is another matter, and is dependent on political judgments, cultural values, national priorities, and principles of equity.

Finally, an issue posing very difficult questions is the ability of modern medical technology to modulate if not control the process of dying. Rising concerns, generated by humanistic and personal insights, have prompted clinical, educational, and other research programs to help seriously impaired or dying individuals and their families. There are also emergent ethical and scientific issues concerned with the definition of death and the use of technology to prolong life.

### Priorities

Against that background, a number of research priorities can be recommended to build on what we know and to aid in the making of effective policies for a rapidly growing segment of our population:



### Reduction and Prevention of Dependency

Dependency--social, economic, and physical--is a particularly serious problem for the very old, and for the young who care for them. There are several issues that should be studied as part of efforts to blunt the impact of such dependencies or to prevent them altogether

- o the process by which an impairment becomes a disability, including the pertinent social, psychological, and biomedical factors
- o the physiological and psychological variables related to changes in cognitive functioning in the aged; i.e., memory, learning, intelligence, and perception
- o distinction of age-caused from age-associated decrements, and identification of those that can be prevented, treated, or ameliorated

Given the fundamental mental and physical vigor of the aged, research on dependency leading to effective programs can give the elderly fruitful and satisfying lives.

### Income Maintenance

As the proportion of retired persons in our population increases, so will the absolute costs of income maintenance programs. How will these programs be paid for? Answers may be obtained by expanding the use of demographic projections and models--the first to estimate the probable costs of income maintenance programs, and the implications for corporate and personal income taxes; the second to simulate the economic and social effects of alternative ways to provide income and service to the elderly.

### Age Discrimination in Employment: The Retirement Process

The rising number of elderly people, the increased financial burdens of support programs, and the evidence that chronological age itself usually has little bearing on social and intellectual competence are several of the elements forcing an examination of why people retire, particularly of the elements--social, financial, employment--that enter into individual retirement decisions. The ultimate effects of retirement pressures on the larger society should continue to be examined. In addition, we should



- o establish functional rather than chronological criteria of social and intellectual competence
- o seek mechanisms--such as demonstration programs--to enable people to be economically productive beyond the usual retirement ages
- o examine the attitudes of both young and old toward work and leisure

#### Life Experiences and the Aged Personality

We need precise information on the effects of life experiences on the elderly. For example, does the aging cohort (age cluster or group) that lived through the depression display a different social and behavioral pattern than a cohort that did not? How are different work histories reflected in financial security (or lack of it) in retirement? What are the effects of changing patterns of work and leisure on the lives of different cohorts? Subtle influences of experiences as a child and young adult should be examined, including

- o the management of crises
- o different social roles in family, work, and community
- o negative stereotypes of the aged

#### Social Competence and Social Integration

An examination is needed of the factors--social, cultural, and environmental--that make for social competence and personal satisfaction in late life, irrespective of the level of social integration. Specific elements that should be examined include

- o the different problems of men and women in maintaining social competence and, where desired, achieving social integration
- o racial, ethnic, and social factors

#### The Aged and Their Families

Family and kin provide important social and sometimes economic support for many of the elderly. What is the nature of the relationship of the elderly with their families? How do different relationships--perhaps determined by different ethnic



and cultural values--affect dependency reduction and the maintenance of social competence? Are the changing roles of women--more working--affecting the abilities of families to care for their aged? If so, what are these effects and what do they portend? How are changing family structures--for example, single-parent families--altering the relationships between the elderly and their families and kin? These and similar issues must be addressed as part of an effort to develop policies that emphasize the family as one crucial supportive resource.

#### Mortality Rates: Men vs. Women

On the average, women live eight years longer than men; and in 1974 there were 143 older women per 100 men, with the gap widening. Genetic predisposition, hormonal differences, and stress are among the explanations offered. More intensive research is needed to specifically identify the elements that account for the higher morbidities and mortalities of men.

#### Social Experiments

The Medicare and Medicaid programs are natural social experiments, since they can be used to examine the effects of certain types of payment mechanisms on the lives of older persons, their families and communities, and various parts of different health-care systems.

There should also be limited, small-scale social experiments on

- o flexible or "phased" retirements
- o the impact on older persons of new educational opportunities that provide not only preparation for second careers and meaningful leisure, but also for self-care in old age
- o alternative forms of social and health service systems
- o alternative physical and social environments, including housing and long-term care facilities

#### Psychological and Psychiatric Interventions

The maintenance of intellectual functioning among the aged and prevention of so-called organic brain syndromes and senile dementias are obvious and critical importance. Well-planned



programs of research should stimulate the development of a clinical psychology and psychiatry attuned to the mental health problems of the aged.

#### Government Policies and the Aged

The effects of various governmental policies upon the current and future aged should be examined. What are the effects of manpower and training programs on employment patterns of the aged? How do macro-economic policies used to stimulate the general economy or restrain inflation affect retirees? What are the consequences for older persons, their families, and communities of governmental policies on housing, transportation, health care, and pensions? Are there differences in the respective effects of such policies on the rural and the urban elderly?

As the population of older persons enlarges and as the characteristics of successive cohorts (clusters or groups) diverge, such studies will be particularly important to city and regional planners for the coming decades.

#### RESEARCH ON HUMAN SERVICES AND DELIVERY SYSTEMS

Older persons must have an effective network of facilities, programs and services to survive short-term crises and meet long-term needs. Without these supports many lose their capacity to live independently or semi-independently in their own homes or communities.

Services for people in the U.S. are provided by a pluralistic system of governmental (federal, state and municipal), private non-profit (voluntary) and commercial agencies. But many of these agencies have not developed programs that meet the special needs of the aged. For example, the elderly are commonly not provided preventative medical services--such as early diagnosis and treatment--that can forestall new problems.

Services have frequently been separately developed or legislated with no planned relationship of one system or set of resources to another; with conflicting legislative language, regulations, and funding policies and practices; ambiguous program objectives; and incongruence between agency or program goals and needs of older persons.



Given the varied and changing needs of older persons, programs of health and social care to be effective must be comprehensive--ranging from provision of simple information to direct services needed to maintain physical and mental functioning. The design and the evaluation of effective, truly comprehensive programs must be based on systematic, well-planned research and analysis.

Research has been or is being done in several service areas of particular pertinence to the elderly--physical, mental and dental health; nutrition and food services; physical living environments; employment and other economic supports; the commercial marketplace; transportation; communication; social services; legal and physical protection; education; civic participation; leisure and recreation; and spiritual well-being.

These studies have led to a number of findings that can be usefully addressed to improve the effectiveness and range of services and their delivery to the aged:

#### Medical Care

Medical knowledge and techniques are available to ameliorate many of the illnesses of late life. But existing health-care systems are organized primarily to deal with acute, episodic illnesses in hospital settings. Institutional health-care systems are, by and large, not linked to community-based systems for primary, preventive, rehabilitative or supportive care, although such arrangements are particularly suited to the need for the long-term care of many older citizens. Compounding the lack of adequate facilities for the care of the aged is the fact that medical education does not provide an adequate basis for modern geriatric care.

#### Home Care

While older persons have high rates of chronic illness and disability, they continue to function in the community when services are available. But a study in 1972 found that 54 percent of all American communities, including 99 with populations of more than 50,000, had no home health agency whatsoever. And less than 1 percent of Medicare expenditure went to home health services in 1971. Yet, home care may save health dollars, and in many cases is the most appropriate option for proper care of the older person.



### Mental Health Care

Studies of mental health in later life indicate that approximately 15 percent of the population 65 and older are in need of treatment or intervention to maintain their mental health. For each 5 years beyond 65 the total proportion of persons moderately or severely mentally ill increases, from about 10 percent at age 65 to approximately 30 percent at age 80. Those elderly thus afflicted are responsive to treatment if or when appropriate treatment is developed and provided.

Pertinent research questions are: What kind of a delivery system should be developed to meet the mental health problems of the elderly? Should mental health services be delivered separately from other health care and social service systems? Should a new structure such as "health maintenance organizations for older persons" be created that integrates physical and mental health, social and other services?

### Nutrition Services

Food consumption studies confirm that the diets of older persons are often below standard both in quantity and quality. While poorly nourished people are at greater health risk, and nutrition is related to certain diseases which are reversible, the number of nutrition programs for older persons is very limited. Demonstration models of nutrition services for the elderly have been largely descriptive in nature, testing feasibility and determining cost. There is also a need to study the impact on the client and community, to identify nutritionally vulnerable groups, to test ways to incorporate nutrition counseling into primary health care, and, most fundamentally, to determine the nutritional needs of older persons.

### Housing Services

Specially-built housing and age-oriented environments often benefit the elderly. Improvement of present housing is even more important than specially-built housing, since 70 percent of the housing occupied by the elderly is also owned by them. Research on specific housing alternatives and service packages, and cost estimates for those alternatives and service packages, should quickly yield benefits.



### Institutional Care

Where the appropriate option is institutional care, research is nonetheless needed to understand and cope more effectively with the impact of institutionalization. Studies are needed to assess the quality of institutional care.

An estimated 2.4 million persons aged 65 and older do not need institutionalization, but do need appropriate shelter and services to remain in the community. A critical problem is to find the optimal match between each individual and that environment which is most capable of meeting his or her needs--a task to which research can contribute wisdom and methods.

### Reimbursement for Services

Availability and use of long-term care services tend to follow changes in reimbursement mechanisms. Social experiments are needed to provide the data to analyze the relationship between various reimbursement methods and the effectiveness of long-term care and other social services.

### Transportation and Communication Services

Studies indicate that transportation is least adequate for the aged groups most in need--the physically frail, persons without family or kin, minorities, inner-city dwellers and the poor. Improved transportation is a means of linking people and services. Research and social experiments to create and test other ways to link people and services are still needed, including home delivered services of all types and the use of new technologies, for example cable television and citizen band broadcasting.

### Legislated Social Services

Revenue sharing, Title XX of the Social Security Act as amended in 1975, and similar legislation apparently has not significantly increased the level of social services for the elderly. Research is needed to determine how resources provided in the legislation can be better deployed on behalf of the elderly.

### Social Security

The Social Security system remains a major source of retirement income, replacing an estimated 25 percent of pre-retirement earnings. While Supplemental Security Income is an



improvement over Old-Age Assistance, the projected increase in the number of beneficiaries has not materialized. Research is needed on

- o the reasons--including institutional problems--why greater numbers of qualified individuals have not applied for Supplemental Security Income
- o improved techniques for informing and registering those who are qualified for SSI

#### Medicare

Medicare, providing third-party payments of certain health costs, has obviously helped our older citizens. But increasingly, it pays less of the older person's health bill and seems to be least adequate in the most serious area--long-term care. Continuing research and analysis of Medicare's drawbacks and of possible remedies are needed.

#### Comprehensive Services

To respond to the growing needs of present aged and the increasing number of future aged, research in the delivery of comprehensive services is urgent. No community in the U.S. has a full range of services for the aged, and limited social experiments have not adequately documented the optimum range and mix of health and social care programs. While many of the findings of these experiments have been useful in planning and policy development, what we do know is small compared to what we do not know.

Studies of options for providing continuity of care, including preventive and rehabilitative care and methods for organizing and financing services and their delivery, that can yield practical benefits for the care of older Americans, remain to be conducted. Two promising models for experimentation are:

- o "one stop" centers, perhaps sited at specially designed housing for the elderly, to which the elderly can come with a minimum of travel and inconvenience
- o a new type of "health maintenance organization" for older people that provides physical and



mental health care, social services, financial assistance, and aides for those who need help with personal and household services

Experiments on these and other models could address such questions as what are suitable mixes of a range of services? What impact does integration of services have on the older individual? How does integration affect use of services and cost efficiency? What is the role of voluntary groups and agencies? What is the appropriate role of family, ethnic and neighborhood groups in the provision of services? What is the cost and effectiveness of alternative models of service delivery?

#### Data

Data are needed on what services do exist, their adequacy and gaps, which are and are not used, and who in the population uses them. More exact demographic and epidemiologic information about population trends is also needed to anticipate and prepare for services needed by the future aged.



## Chapter IV

RESEARCH RESOURCES

"The Secretary may also provide training and instruction and establish traineeships and fellowships, in the Institute and elsewhere, in matters relating to study and investigation of the aging process and the diseases and other special problems and needs of the aged." 1/

Reduction of psychological and physical dependency, extension of active and useful life, prevention and treatment of age-associated diseases, design of service systems to foster self-care by the elderly--these and other research priorities described in the previous chapter require several resources, including:

- o well-trained investigators given the opportunity to do research on aging and the problems of the aged
- o animal and human populations in which the normal and abnormal aspects of aging may be investigated
- o basic data--demographic, epidemiological, clinical--needed to shape research programs and determine their effectiveness

MANPOWER: EDUCATION AND TRAINING

The Research on Aging Act of 1974 specifies two purposes for advanced education and training in age-related areas:

- o as preparation for research on "the aging process and the diseases and other special problems and needs of the aged"
- o "to ensure the education and training of adequate numbers of allied health, nursing, and paramedical personnel in the field of health care for the aged"

1/ The Research on Aging Act of 1974, P.L. 93-296



With the present size and prospective growth of the aged population, gerontologic research is an undeniable need. The essential element in fulfilling that need is a research community--a sufficient number of highly trained biologists, chemists, physicians, sociologists, psychologists, economists, and others--with a long-range career commitment principally to research on the process of aging and the needs of the aged.

The question of what is a "sufficient number" brings in the stipulations of the Research Training Act of 1974, which mandated that the Secretary of the Department of Health, Education, and Welfare "arrange for the conduct of a continuing study to establish (a) the Nation's overall need for biomedical and behavioral research personnel, (b) the subject areas in which such personnel are needed and the number of such personnel in each area, and (c) the kinds and extent of training which should be provided such personnel . . ."

The "continuing study" is being conducted for the Secretary of the Department of Health, Education, and Welfare by a committee of the National Research Council. In its first report, issued in 1975, the committee emphasized the importance of training grants for modulating the supply of trained researchers--MDs and PhDs--in various fields, including biomedical, behavioral, and health services. The report emphasized the considerable flexibility provided by postdoctoral training: "Support of postdoctorals does not increase the manpower pool, but provides for its improvement and for diversification into more applied areas of special importance . . . [P]ostdoctoral training programs provide the means for preparing researchers more rapidly for emerging and recently recognized priority areas."

The 1976 report of the National Research Council repeated this emphasis on post-doctoral training, and, of special pertinence to research on aging, noted that the "opportunity for M.D. and Ph.D. graduates to be trained together during the post-doctoral period is widely regarded as a valuable aspect of this experience."

While postdoctoral training grants are certainly an effective mechanism for increasing the numbers and competence of trained researchers on aging, other support mechanisms are also important, including predoctoral and institutional training grants. Training grants can also be used to catalyze the creation of graduate and postgraduate programs that focus on the interdisciplinary aspects of research on aging.



Whatever mechanism is used, they must assure that the programs are of uniformly high quality. To quote again from the 1976 report of the National Research Council:

"...the federal responsibility for health research training goes beyond the simple assurance of access to graduate and postgraduate training, and extends to the provision of programs that are of a high level of excellence in areas relevant to the national interest [emphasis added]."

Remedies which are urgently recommended for alleviating deficiencies in available trained manpower include: expansion of the current support of predoctoral, postdoctoral and institutional training grants for research on aging; expansion of pre- and postdoctoral fellowships and Research Career Development Awards; and reintroduction of authority to support Special Fellowships, in order to attract established investigators to research on aging. The dimensions of this urgency are defined in disciplinary terms as follows:

#### Biomedical Sciences

In the basic biological sciences, for example, there are currently no adequate, well-rounded research training opportunities for pre- and postdoctoral students wishing to specialize in the biology of aging. Nor is there any existing mechanism for an established investigator outside of gerontology to enter the field.

The manpower needs for clinical research efforts can be met most effectively by postgraduate training programs that enable young physicians to apply their knowledge to specific clinical issues. Such trained researchers would ultimately perform in concert with the physician, dentist, and nurse to identify and manage clinically significant changes; to analyze and guide the prevention and treatment of geriatric infirmities and diseases; and to support programs that enable the aged to function despite a range of crippling, usually chronic disorders.

Presently, clinical research training programs are wholly inadequate. There is no requirement by any medical schools that their students receive part of their training within nursing homes, long-term care institutions or home-care programs. Among the medical schools there are only two formal training programs in geriatric medicine, and very few centers in which any sort of training for research in clinical gerontology can be obtained. This gap between growing need and the limited number and scope of train-



ing programs is especially critical now as more medical schools, VA hospitals, and other research centers seek to establish coordinated programs on research in aging. Training programs to meet this growing need for clinical researchers might encompass a 5-year postgraduate program in internal or family medicine which emphasizes clinical gerontology and includes didactic work in a school of public health.

Clinical gerontology should also be a standard part of the graduate and undergraduate curricula of schools of medicine, dentistry, nursing, and allied health. By and large medical students now get little or no exposure to the medical problems of the elderly, a lack reinforced by the prejudice toward the aged often displayed by teaching and practicing physicians. The introduction of clinical gerontology into curricula may also reinforce a principle that applies to other areas of clinical medicine--that more attention must be given to the prevention of illness rather than simply its treatment.

#### Behavioral and Social Sciences

Training programs are needed that will enable graduate and postgraduate students to apply their education to basic and applied research issues in aging. Such training programs should emphasize the interdisciplinary nature of many issues in aging; for example, the valuable insights provided when psychologists, economists, and sociologists cooperatively probe the factors that create dependencies in aging individuals and groups.

Human population studies that deal with the social and psychological problems of aging such as grief, loss of family roles, or the end of regular employment provide the opportunity to improve the quality of life for the elderly and may help unlock some of the problems that beset our young and middle-aged populations.

#### Human Services and Their Delivery

A professional cadre is needed concerning itself with research on how services are planned, organized, delivered, and evaluated. It must design programs that can deliver effective medical, social, economic and other support services to the elderly against a backdrop of limited funds, shifting national and local priorities, insufficient chronic care facilities, and various cultural and social settings. Such program design must be sensitive to the problems of many of the elderly--inadequate housing, income, medical care, nutrition, and social services.



Graduate and postgraduate students as well as established professionals must be provided training for research on administrative, political, social, health care and other service systems. And, again, mechanisms must be created for a multi-disciplinary approach where needed.

#### Research on Education and Manpower

The specific needs for education and manpower in different fields pertinent to research on aging must be supplemented by research on:

- o the educational process--to test, evaluate, and develop methods and models of gerontologic and geriatric training
- o manpower needs--to analyze the types and numbers of personnel required now and in the future to meet specific needs for researchers described above

#### RESEARCH MECHANISMS AND TOOLS

Effective research requires not only competent manpower but also mechanisms and tools suited to the problems to be addressed. Mechanisms include regional and university-based research centers where many can focus on a particular problem. For example, recent studies on alcohol and aging required the collaboration of clinical gerontologists, physiologists, pharmacologists, biomathematicians, and experimental psychologists.

While a few centers do exist, most gerontologists still work separately and in relative isolation. Lack of centers also reduces the opportunities for collaborative research and the likelihood of attracting to gerontology able investigators from other fields. Such regional, university-based research centers would not only provide foci for the concentration of a small pool of first-class talent, but would also provide more effective training for students, as well as easier access to necessary resources at reduced cost.

#### Experimental Resources

Human population groups are the most important single experimental resource in aging research. Finding such groups, recruiting them, and gathering the needed data is difficult and often expensive. The effort may require, particularly in longitudinal studies, literally a lifetime of work--an extraordinary commitment by investigators, research subjects, and funding agencies. Yet such studies, cross-sectional and longitudinal, can now be done with greater accuracy and with a



larger yield of data than was possible 10 years ago. The discussion of research priorities in Chapter III delineated the promising issues which can be addressed by such studies. For example, aging and atherosclerosis are separate, distinctive processes, but their frequent association complicates our understanding of the two basic processes involved--one leading to a normal stage of human development and the other to disease. Longitudinal studies of biochemical, physiological, social and behavioral characteristics on populations largely free of atherosclerosis could add enormously to our understanding. Such studies could provide measures of the normal aging process, including the rates of biological aging, independent of the effects of the common chronic diseases of middle- and old-age. Typical of other questions that can be asked are:

- o what living arrangements for the elderly produce the greatest life satisfaction and the lowest rates of morbidity and mortality?
- o what is the relationship of socioeconomic status to differences in longevity between men and women?

A small number of population laboratories seems to be the best mechanism for carrying out large-scale population studies. Such laboratories must have:

- o cooperative and adequately large populations suited to the questions to be studied
- o sophistication in demography, epidemiology, biostatistics, and computer sciences
- o investigators willing to make a long-term commitment --over a decade--to studies of human populations
- o long-term commitment of uninterrupted financial support

#### Animal Populations

A wide variety of organisms other than humans are or should be used in aging research. These include animals such as subhuman primates, pedigreed dogs, rats and mice; metazoa such as nematodes, protozoa such as the ciliates and the amoebae, and cultured mammalian cells.

Rats and mice are useful and popular in aging research because they have short lives, cost comparatively little, and can be genetically defined. Moreover, colonies of rats, mice and sub-



human primates can be reproducibly maintained in institutional and commercial facilities for shipment to investigators. However, the availability of such colonies is at present extremely limited; only two NIH-supported colonies of rodents for use in aging research now exist. These do not meet the present demands of the scientific community, much less their projected needs.

Thus, there is an urgent need for regional animal distribution centers to facilitate and encourage the interest in aging research generated the past five years. Similarly, support of existing subhuman primate centers should be vastly increased the next several years.

Different in scope but equally essential to aging research is the maintenance and expansion of existing banks of cultured mammalian cell lines. The availability of such cell lines has already spurred new directions in aging research, including:

- o analysis of the biochemical similarities and differences among cells taken from species with different life spans
- o establishment of cell banks as repositories for cells taken from individuals afflicted with genetic diseases related to premature aging, such as Werner's syndrome and progeria.

#### INFORMATION SYSTEMS AND RESEARCH EVALUATION

To improve the effectiveness and efficiency of research we should have:

- o an inventory of research projects underway or completed
- o access to data from prior research surveys, censuses, and so on

#### Inventory of Research

A centrally-available index on prior and current research is important to a field such as aging that cuts across many related subjects and disciplines. A system for maintaining a continuing inventory of research in aging could help to:

- o avoid unwarranted duplication of research
- o identify trends and patterns or reveal gaps in efforts



- o stimulate new ideas for research planning or for innovations in experimental techniques
- o provide a resource for technological forecasting and development

Such a central inventory could link with more generalized research inventories--e.g., the Smithsonian Science Information Exchange (SSIE) and the Computerized Retrieval of Information on Scientific Projects, NIH (CRISP).

An inventory of aging research (other than biomedical) has recently begun. This "Comprehensive Inventory and Analysis of Past and Current Federally Supported Research in Aging," sponsored through contract by DHEW's Administration on Aging, will cover the past 10 years.

#### Data Banks

Data collections which have potential utility for research on the biomedical, psychosocial, and service delivery aspects of aging exist in various forms and at various sources. They may or may not be identifiable as being addressed to aging, yet an aged group might constitute a significant portion of a total population or sample under study. The data may represent one-time or continuous studies, longitudinal or cross-sectional designs, general purpose or program-oriented statistics, national, local or even narrower populations.

An extremely useful resource would be a data index to aging-related statistics from research studies and from data collection sources such as the Bureau of the Census, the National Center for Health Statistics, and the Social Security Administration.



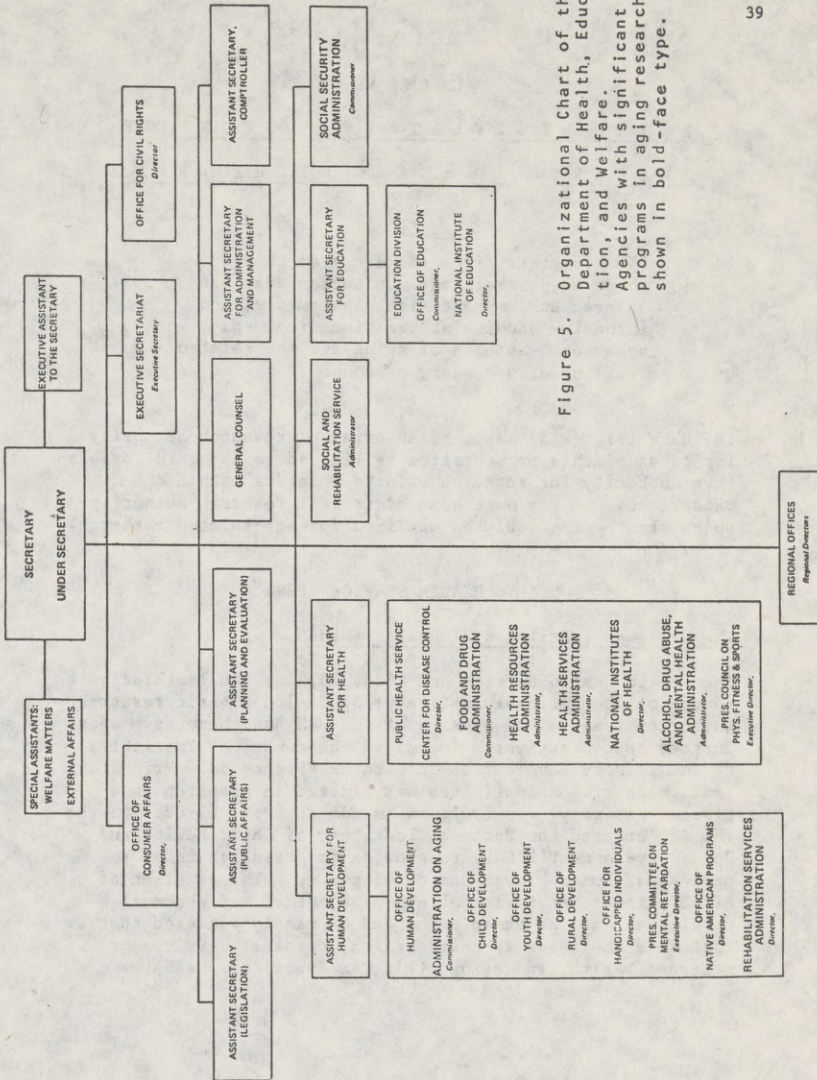


Figure 5. Organizational Chart of the Department of Health, Education, and Welfare. Agencies with significant programs in aging research shown in bold-face type.



## CHAPTER V

B R I E F   L E G I S L A T I V E   H I S T O R Y   O F  
R E S E A R C H   I N   A G I N G   W I T H I N   H E W

"The Congress finds and declares that . . . there is no American institution that has undertaken comprehensive, systematic, and intensive studies of the biomedical and behavioral aspects of aging and the related training of necessary personnel."

The DHEW (Figure 5) has a broad array of research authority. The focus of this presentation is limited to the main legislative authority for research efforts in aging within the Department. It may omit some additional research authority which might conceivably be utilized for age-related research.

## PUBLIC HEALTH SERVICE (PHS)

The National Institutes of Health (NIH)

The Public Health Service Act (Sec. 301) is the legislative source of the National Institutes of Health's basic research authority. Since the passage of the PHS Act there have been further enactments which increased the number of Institutes to the present level of 11 Institutes (Figure 6). Prior to 1962, each of the Institutes was limited to research in a disease category. In 1962, an amendment (P.L. 87-838) to the PHS Act created the National Institute of Child Health and Human Development (NICHD) to provide for research into "the process of human growth and development." The creation of NICHD allowed for research into both normal and abnormal development of the human being and expressly declared that it include such fields as child health, prenatal development, maternal health, and aging. (1) The Report of the House

1/ The Research in Aging Act of 1974, P.L. 93-296



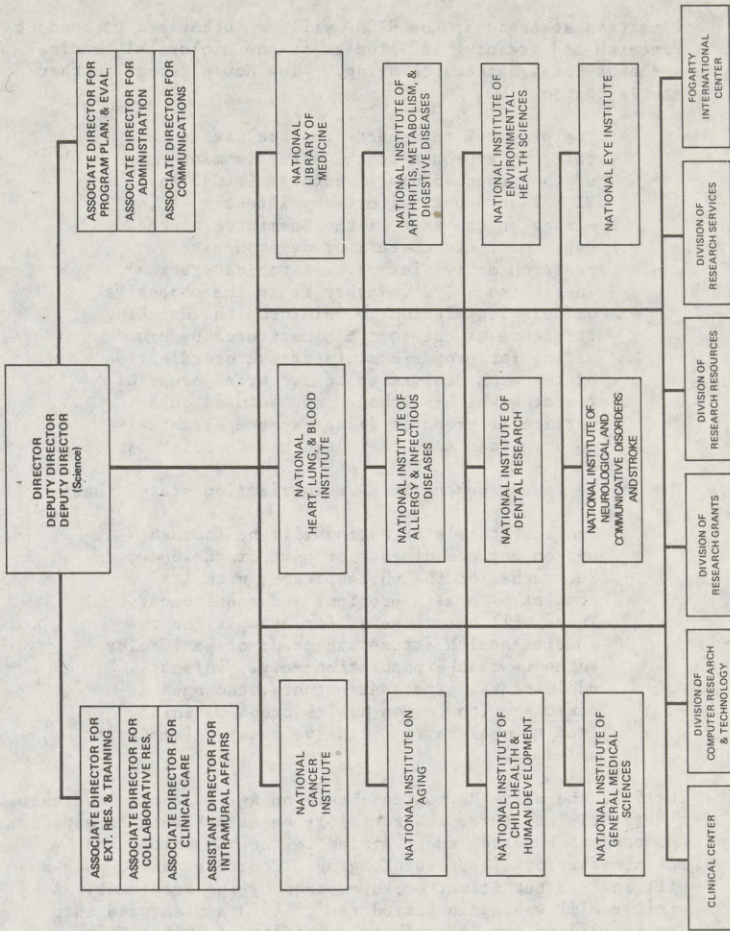


Figure 6. Organizational Chart of the National Institutes of Health.



Committee states that the NICHD will be authorized to conduct research and training in "studies in the biological, medical and behavioral aspects of aging." The House Report further states that:

The proposal to depart from the disease category approach in the establishment of the proposed new Institutes (NICHD and NIGMS) does not reflect any intent--either on the part of the Committee or the Department--to curtail or de-emphasize research activities of existing categorical Institutes . . . . Rather it is the objective of this legislation to reinforce the existing structure of categorical Institutes by providing for proper administrative coordination of research activities in two broad areas of research which--although not focused on a particular group of diseases--are essential to any broad advance in the health sciences. (2)

The Senate Report on the NICHD authorization stated that:

The Institute's attention will be focused, not on any one disease or part of the body, but rather on the whole person, with its complex of health problems and requirements. There will be emphasis, for example, on the special health status and needs of particular segments of the population--e.g., infants, adolescents, expectant mothers, and aged persons--with common health problems which lend themselves to intensive study. [emphasis added] (3)

In 1971, the White House Conference on Aging recommended that a National Institute of Gerontology be established to support and conduct research and training in the biomedical and social-behavioral aspects of aging. Congress passed such a bill in 1972 but it was pocket-vetoed by the President. A similar bill was again introduced in 1973 and enacted into law in 1974 as the Research on Aging Act of 1974. This statute created the National Institute on Aging by adding new sections (Sec. 461-464) to the Public Health Service Act.



The statute establishing the NIA directs that the Institute conduct and support biomedical, social, and behavioral research and training related to the aging process and the diseases and other special problems and needs of the aged.

The legislative history of the Act reveals that both the House and Senate Committees felt that research into aging was important enough to grant it an independent status within the organizational structure of the National Institutes of Health. (4)

The issue of overlapping jurisdiction and duplication of effort by the new Institute was raised and addressed in the House Report, and in the Floor debate. The Committee stated that the bill provided the Secretary with authority to (1) assign responsibility for research and training to the new Institute or another Institute, or to both of them and (2) be responsible for coordinating such activities so as to avoid unproductive and unnecessary overlap and duplication. (5)

#### Health Resources Administration (HRA)

The Health Resources Administration operates under the authority of the Public Health Service Act, Sec. 304-306. These sections authorize the Secretary to undertake through the National Center for Health Services Research and the National Center for Health Statistics and any other units of the Department, the conduct, support and coordination of health services research, evaluation, and demonstrations, as well as health statistical activities. The same Act also authorized the Secretary to coordinate in the same context, health services research, evaluation and demonstration with the experiments and demonstrations authorized by the Social Security Act and the Social Security Amendments of 1967. (6)

The enactment of the Partnership for Health Amendments of 1967 provided a Government-wide focus for health services research. The Health Services Research, Health Statistics and Medical Libraries Act of 1974, revised and extended the programs of health services research. In addition, the Center for Health Services Research was given the responsibility for the development of an overall health services research strategy and provided for the coordination of health services research activities for the entire Department. (7)



### Health Services Administration (HSA)

The primary mission of the various Bureaus within HSA is the actual delivery of services or the support through grants, contracts, and other arrangements to provide services. HSA thus tends to be a utilizer of research to improve health care delivery. The legislative mandate for HSA is found primarily in the Public Health Service Act and the Social Security Act. The research and development aspects of health services were separated with HSA having responsibility for health delivery and health service system development.

### Alcohol, Drug Abuse & Mental Health Administration (ADAMHA)

ADAMHA is comprised of three Institutes--National Institute on Alcohol Abuse and Alcoholism, the National Institute on Drug Abuse, and the National Institute of Mental Health. Each Institute has research authority with implications for research in the field of aging (Figure 7).

The National Institute of Mental Health was created by Sec. 455 of the Public Health Service Act. It also functions under the Mental Retardation Facilities and Community Mental Health Centers Construction Act of 1963. NIMH carries on a broadly based research and development program. (8)

The legislative history indicated concern over the increasing age of the population and the implication for mental health research stating:

There is evidence also, that the number of mental cases is increasing out of proportion to the population increase. While the rate for a given age group is probably no higher than in the past, the rapid increase in the average lifespan is probably responsible for this rise since the incidence of mental disease increases with age. The number of persons age 65 and over is expected to double within the next 10 years, as compared with an overall population increase of only about 23 percent. Unless positive steps are taken, we must, therefore, expect the problem of mental diseases to increase as our population grows older. (9)



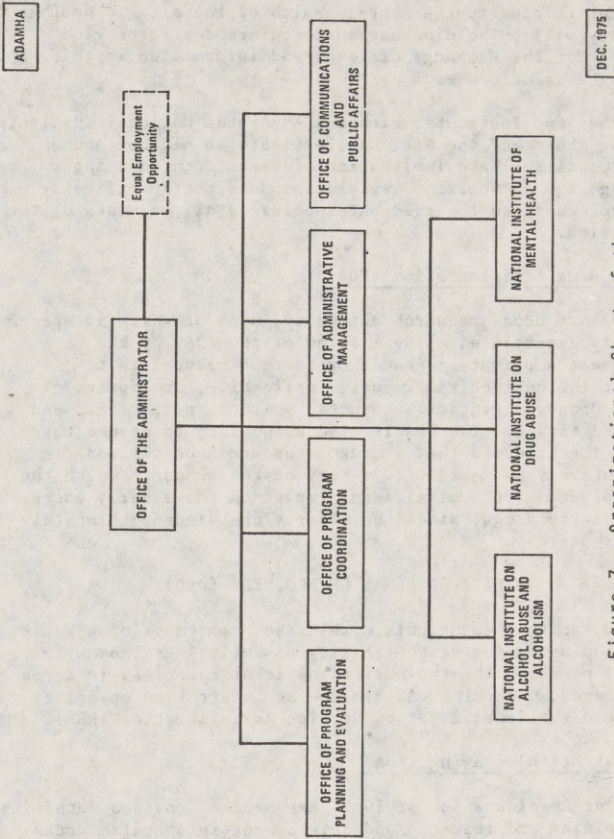


Figure 7. Organizational Chart of the Alcohol, Drug Abuse, and Mental Health Administration. Aging research is a significant component within the National Institute of Mental Health.



In 1975, NIMH established a new Center for Studies of the Mental Health of the Aging. The Center will develop, coordinate and evaluate programs of research, training, and services related to the mental health of the aging. Another activity will be holding national conferences to provide a forum for the exchange of ideas and information in this growing area of concern.

The other two Institutes within ADAMHA--the National Institute on Drug Abuse and the National Institute on Alcohol Abuse and Alcoholism--have implications for research in aging although the authorizing legislation does not specifically make reference to the aged but applies to all segments of the population.

#### Food & Drug Administration (FDA)

The FDA has broad research authority, none of which is specifically age-related. The mission of the FDA, as the government's primary consumer protection agency, is to protect the public from impure, ineffective, or impaired foods, drugs, biological products, poisons, pesticides, and food additives. The FDA is also authorized to ensure that all of the products that it regulates are honestly and informatively packaged. (10) Many of the products which the FDA analyzes have a significant impact on the elderly users, particularly drugs, since the elderly are disproportionately greater users.

#### OFFICE OF HUMAN DEVELOPMENT (OHD)

The OHD, another major unit within the Department of HEW, is described as having responsibility to "help Americans with special needs." The two most significant agencies, in terms of the aged, under the OHD are the Administration on Aging (AoA) and the Rehabilitation Service Administration (RSA).

#### Administration on Aging (AoA)

The Older Americans Act of 1965, as amended provides authority for training and research and development in specific areas of concern, e.g., to study current patterns and conditions of living of older persons, to develop and demonstrate new approaches, techniques, and methods which hold promise of substantial contribution toward wholesome and meaningful living and for coordination of community services for older persons.



Impetus for the creation of the AoA resulted from the White House Conference on Aging in 1961. The original statute gave the AoA the authority to assist the Secretary in all matters pertaining to the problems of the aged and aging.

The Senate Committee was impressed with the success of the projects supported by AoA so that in 1967 the appropriations for research and demonstrations were increased. (11)

In 1973 amendments to the Act made considerable changes in the entire structure of the AoA and added significantly to its research mandate through the authorization of Multidisciplinary Centers for Gerontology. The mandate of the Centers include:

The conduct of basic and applied research on work, leisure, and education of older people, living arrangements of older people, social services of older people, the economics of aging, and other related areas. (12)

In addition, these centers are charged with the responsibility of stimulating "the incorporation of information on aging into the teaching of biological, behavioral, and social sciences at colleges or universities" and "also, to create opportunities for innovative, multidisciplinary efforts in teaching, research and demonstration projects with respect to aging." (13) The multidisciplinary centers were created in response to the results of a study on the need for trained personnel in the field of aging, mandated by the 1967 Amendments to the Older Americans Act.

This study notes that a major hindrance to the development of such centers has been the lack of general purpose financial support from the Federal Government, which limits its aid to funding specific research and training projects. (14)

A new and expanded evaluative function was also added to the Act which granted the AoA the authority to:

carry on a continuing evaluation of the programs and activities related to the purpose of this Act, with particular attention to impact of Medicare and Medicaid, the Age Discrimination Act of 1967, and the programs of the National Housing Act



relating to housing for the elderly and setting standards for the licensing of nursing homes, intermediate care homes, and other facilities providing care for older people. (15)

The 1975 amendments to the Act extend gerontological training and research authority for an additional two years and also authorizes a new research area, namely, the legal problems affecting older persons.

#### Rehabilitation Services Administration (RSA)

The Rehabilitation Act of 1973 consolidates all research and training authority of predecessor legislation. This Act provides authority to develop new applications of the most advanced medical and rehabilitation technology and services to help handicapped persons through research, special projects and demonstrations. (16)

The Act consolidates four areas of special emphasis into a single special project authority (Title III), including projects for older blind individuals.

#### SOCIAL SECURITY ADMINISTRATION (SSA)

The Social Security Act of 1935 granted the Secretary the authority to study and make recommendations as to the most effective methods of providing economic security through social insurance.

In 1956, provision was made for cooperative research and demonstration projects (P.L. 84-880, Sec. 1110) that would lead to the prevention and reduction of dependency. One change of significance was made in Sec. 1110 (P.L. 90-248) by granting specific authorization for research to the Social Security Administration separate and distinct from that of the Social and Rehabilitation Service. (17)

With the advent of Medicare and its administration by the Social Security Administration came additional research authority in the form of Section 1875. This section provides authority to make studies and develop recommendations to be submitted to Congress related to the health care of the aging, including studies and recommendations concerning



the adequacy of existing personnel and facilities for health care for the purposes of programs under Title XVIII; methods for encouraging economical alternatives to in-patient hospital care; and the effects of the deductibles and co-insurance provisions upon beneficiaries, providers of services, and the financing of the program. (18)

With the enactment in 1972 of P.L. 92-603, Sec. 222 provision was made for demonstration projects designed to determine the relative advantages and disadvantages of various alternative methods of making payments on a prospective basis to hospitals, skilled nursing facilities, and other providers of services for care provided by them under Title XVIII of the Social Security Act as well as Title XIX and V of the Act. Also included, were demonstrations of homemaker, day care, and extended care projects. These projects have great potential for the health care of the aged. (19)

#### OFFICE OF EDUCATION

The inclusion of research authority of specific concern to aging within the education programs administered by the Department is a relatively new development. In 1973, Public Law 93-29, the Comprehensive Older Americans Act Amendments, added a new Section 110 to Title I of the Higher Education Act of 1965. (20) The House and Senate Reports are almost identical in their language calling for grants to institutions of higher education to plan, develop, and carry out programs specifically designed to apply the resources of higher education to the problems of the elderly.

Public Law 93-29 also included an amendment to the Adult Education Act which added a new Section 310 authorizing special projects for the elderly and programs for those elderly persons whose ability to speak and read the English language is limited and who live in areas with a culture different from their own. (21)

The Vocational Educational Act of 1963 as amended provides for research in specified areas, i.e., consumer and homemaking programs, etc. (22)



The National Institute of Education and the Fund for the Improvement of Post Secondary Education, created by P.L. 92-138, provides for educational research and development. Although no specific reference is made to the aged, its mandate provides for individuals of all ages and circumstances. (23)

#### ADVISORY BODIES AND COORDINATION

The two main advisory groups in aging are the Federal Council on Aging (FCA) created in 1973 and the National Advisory Council on Aging (NACA) created in 1974. The role of the FCA is to advise the President, Secretary, Commissioner on Aging, and Congress. The FCA also has been authorized to undertake studies which promote the interests of the aged with several areas specified, i.e., the interrelationship of benefit programs for the elderly, the impact of all taxes on the elderly, and the effects of formula grants. While the FCA may conduct studies, it is not an operational agency which supports research. (24) Its primary focus is oversight or advocacy on behalf of the aged.

The NACA's role is to advise, consult with and make recommendations to the Secretary on programs relating to the aged. The legislation also requires the Secretary in consultation with the National Institute on Aging and the NACA and such other appropriate advisory bodies to develop a plan for a research program on aging designed to coordinate and promote research into the biological, medical, psychological, social, educational, and economic aspects of aging. (25) This (one time) plan for a research program on aging is to be transmitted to Congress and to the President.

The legislation also provides for ex officio members on the NACA. Administratively, this has provided for representations from the FCA and other agencies both within DHEW and other Federal agencies. The various pieces of legislation cited in this report direct the Secretary to coordinate the Federal programs within the Department. Coordination is primarily achieved through providing ex officio (Federal) representatives on the NACA, and through the Interagency Committees authorized under the Older Americans Act, as amended.



SUMMARY

The foregoing discussion has attempted to highlight the more significant items of legislation and agencies that have age-specific and age-related authority for research. While there is a possibility for overlap and/or duplication, this is minimized because the focus of the research authority varies sufficiently; the field is broad and multidisciplinary in nature; and the resources for research in aging have been limited.



References

- (1) H.R. Rep. No. 1969, 87th Cong., 2d Sess. 1-2 (1962).
- (2) Id. at 3.
- (3) S. Rep. No. 2174, 87th Cong., 2d Sess. 3 (1962).
- (4) H.R. Rep. No. 93-906, 93rd Cong., 2d Sess. 3 (1974).
- (5) S. Rep. No. 93-299, 93rd Cong., 1st Sess. 4 (1973).
- (6) Public Health Service Act §§ 304-306, 42 U.S.C. §§ 242b-d (1974).
- (7) H.R. Rep. No. 538, 90th Cong., 1st Sess. 17 (1967).
- (8) Public Health Service Act § 455, 42 U.S.C. § 289k-1 (1968).
- (9) S. Rep. No. 1353, 79th Cong., 2d Sess. 3 (1946).
- (10) Directory of Federal Technology Transfer, supra note 27, at 92.
- (11) S. Rep. No. 367, 90th Cong., 1st Sess. 3 (1967).
- (12) Older Americans Act § 421(1)(B), 42 U.S.C. § 3031 (1974).
- (13) Id.
- (14) H.R. Rep. No. 93-43, 93rd Cong. 1st Sess. 20 (1973).
- (15) Older Americans Act § 202(14), 42 U.S.C. § 3012 (1965).
- (16) Op. Cit. at 105.
- (17) Social Security Act § 1110, 42 U.S.C. § 1310 (1956).
- (18) Social Security Act § 1875(a), 42 U.S.C. § 1395(11) (1965).



- (19) Social Security Act Amendments of 1972 § 222, 42 U.S.C. § 1395 (1972).
- (20) Higher Education Act of 1965 § 110 as amended by Public Law 93-29, 20 U.S.C. § 1008a(b) (1974).
- (21) Adult Education Act § 306(a)(4), 20 U.S.C. § 1205 (1974).
- (22) Vocational Education Act § 161(d)(2), 20 U.S.C. § 1341(d) (1974).
- (23) Public Law 92-318 §§ 404-405, 86 Stat. 235 (1972).
- (24) Older Americans Act § 205, 42 U.S.C. § 3012 (1974).
- (25) Public Health Service Act §§ 461-464, 42 U.S.C. §§ 289k-1-5 (1974).



## Chapter VI

RESEARCH COORDINATION  
AND RESOURCE NEEDS

"The Secretary shall, through the Institute, conduct scientific studies to measure the impact on the biological, medical, and psychological aspects of aging of all programs and activities assisted or conducted by the Department of Health, Education, and Welfare." 1/

The discussion of research priorities in the third chapter of this Research Plan illustrates that the phrase "Research on Aging" is an encyclopedic one. It encompasses the most fundamental investigations of the structure and physiology of cells; the difficult, at times expensive, and often lengthy studies of human populations; and the search for ways to reinforce the ability and willingness of many of the elderly to care for themselves, to live independent and satisfying lives.

To begin to address the many meanings implicit in "Research on Aging" requires an incredibly diverse range of training, experimental resources, research tactics, and knowledge.

## COORDINATION

The wide ranging nature of research on aging has been recognized by the Congress by its creation of various agencies, within and without DHEW, that address some aspects of aging and the problems of the aged. The brief legislative history given in the previous chapter made clear that while there are many agencies within DHEW involved in aging research, each agency has a distinct, clearly identifiable function; for example:

The National Institute on Aging conducts and supports biomedical, social, and behavioral research and training related to the aging process and the diseases and other special problems of the aged

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1/ The Research on Aging Act of 1974, P.L. 93-296



The Health Resources Administration is concerned with research in the delivery of health services for the aged, with particular emphasis placed on long-term care, cost-effective and consumer-acceptable alternatives to institutional care, and cost-effectiveness and quality of all health and health-related services

The Health Services Administration is concerned principally with the delivery and provision of services, and, as such, is a client of research, particularly of studies on the improvement of health-care delivery

The Rehabilitation Services Administration is primarily concerned with the problems of the handicapped. As such it addresses many of the problems of the aged, particularly through its efforts to foster the development of the most advanced medical and rehabilitative technology and services to help handicapped persons

These examples are intended to illustrate that while there are many agencies within DHEW directly or indirectly concerned with the aged, they do have unique functions that may overlap but are not duplicative. Rather, properly carried out and coordinated, the work of the various agencies can serve to synergistically raise the level of the research effort on aging.

Given such considerations, it is recommended that each agency within DHEW concerned with aging as part of its mission continue to set its own agenda and priorities, determine its own staffing needs, and, where appropriate, formulate, within Congressional and departmental guidelines, its own research emphasis as expressed in grants, contracts, and other support mechanisms as well as in its efforts to raise the level and quality of trained research manpower.

However, given the overlapping and often potentially reinforcing efforts of many agencies, it is also recommended that the existing coordinative mechanisms be strengthened, and that in particular there be continuing reliance on the advisory capabilities of the Federal Council on Aging and the National Advisory Council on Aging. In addition, it is recommended that the coordinative efforts of the Interagency committees authorized by the amended Older Americans Act be continued and expanded.



## NEEDS

In Fiscal Year 1975, the latest for which actual data are available, an estimated \$25 to \$30 million was spent by DHEW on research directly addressed to various aspects of aging and the problems of the aged--in all, about 1 percent of the total DHEW research budget. This data is based primarily on information furnished by the agencies participating in research on aging as defined above. That amount is too small by any measure, not least the fact that this small and quite limited funding is intended to probe issues and concerns that confront some 10 percent of our population.

Capitalization needs to achieve a base for quality research on aging include four basic areas: defining and developing the human and animal populations to be studied; developing the manpower necessary for research; acquisition of technical resources and equipment; development of a data base for determining factual knowledge about the aging process that currently exists; and, of course, establishment of basic priorities.

It is essential, in the view of the National Advisory Council on Aging that, given both the opportunities for rapid advance in knowledge in the field of aging research and the historical undernourishment of the field, there be a significant national investment in research directly on aging (here defined as funds spent directly for research on aging and the aged by various DHEW agencies). The National Advisory Council on Aging, in its role as advisor to the Secretary, DHEW, recommends an average increase in funding of approximately \$10 to \$12 million per year, beginning in Fiscal Year 1977 and culminating in an annual funding of \$75 to \$90 million by Fiscal Year 1981.

Approximately 190 manyears were devoted to DHEW activities in research directly on aging in Fiscal Year 1975. Of this number, approximately 85 percent was within the National Institutes of Health, with the other 15 percent allocated in other agencies within DHEW. In the future there must be a growth in staff commensurate with the increase in funding in order to utilize these increases prudently and efficiently.

The number of agencies within DHEW participating in aging research makes it impossible to break down the above figures for funding or staffing. The individual agencies within the



Department, through the processes of budget, forward planning, and the Department's manpower management system, will present specific plans and justification for funds and staffing needs relevant to the goals of this DHEW Research Plan.

Following this five-year period dedicated to establishing aging research and achieving the short-term goals of this Research Plan, a reassessment of the status of aging research will be necessary to determine whether this capitalization is sufficient to support the major long-term thrust that will be needed in future years.

Such recommendations may seem demanding. Certainly they should and will compete within the overall priorities of DHEW and of the Federal Government. However, these recommendations are intended to reemphasize and to overcome the historical underfunding of aging research; they are intended to provide adequate capitalization and to remedy, by accelerated and significant increases in the budget, our serious neglect of the need to understand the aging process and the needs of the aged.



S U M M A R Y   S T A T E M E N T   O F  
S E L E C T E D   R E S E A R C H   O P P O R T U N I T I E S

We now have an opportunity to extend our knowledge and to design effective programs to deal with many of the issues that concern aging and the aged. In some cases, we can move ahead fairly rapidly, with applicable returns on our research investment possible within five years; for other issues, their very complexity mandates a longer, more sustained effort, although significant improvement in our understanding is possible within several years.

Some of these issues are listed below, both those amenable to a short term effort of about five years and those requiring a long-term investment:

BIOMEDICAL ISSUES

Short-Term

- o the decline in immunological competence with aging, and its implications
- o variations in the process of aging and the patterns of disease among the aged of different ethnic, racial, and cultural groups and between the sexes
- o the interaction of aging and its accompanying diseases with such external factors as nutrition, physical fitness, and response to medicines.
- o collaborative studies with other Institutes of the NIH and with other DHEW agencies of diseases more common to the aged--e.g., diabetes mellitus, senile dementia (or mental deterioration), atherosclerosis, and osteoporosis
- o effective diagnosis and management of the reversible forms of senility

Long-Term

- o The criteria for healthy and successful aging
- o the mutually interacting influences of aging and disease



- o influence of cultural background on successful aging
- o personal and economic costs of major diseases in old age
- o prosthetic technology as an aid to the maintenance of an independent life

#### BEHAVIORAL AND SOCIAL ISSUES

##### Short-Term

- o the social costs, system costs, and socioeconomic impact of an increased population of the elderly on communities, public and private services, and the elderly
- o flexible retirement policies, their advantages and disadvantages to the society at large and to the aged
- o occupational and social roles for older people
- o adjustments to crises of the life cycle
- o support of income maintenance programs

##### Long-Term

- o relationships among family structure and support, life styles, and patterns of aging
- o middle age as a transition to old age
- o personality changes during life, from young adult to very old age
- o improvement and maintenance of memory
- o the year 2000: the meaning and impact of the new age structure on American society

#### ISSUES IN HUMAN SERVICES AND DELIVERY

##### Short-Term

- o integrated services for the elderly



- o ready access by the elderly to prosthetic aids
- o structural and fiscal basis for improvements in Medicare
- o self care and its relationship to preventive medicine
- o living arrangements for the elderly

#### Long-Term

- o the family as a health and social service delivery system
- o research base for care of the aged under a National Health Insurance System
- o educational opportunities for the aged
- o the environment for long-term care
- o costs of health care in old age

### RESEARCH RESOURCES

#### Short-Term

- o expanded training in geriatrics and gerontology
- o availability of animal and human populations for aging studies

#### Long-Term

- o information systems and research evaluation
- o university based and regional centers for research on aging and the problems of the aged



[From the Washington Post, September 18, 1977]

## AGING AMERICA

## ADAPTING OUR SOCIETY TO AN ERA OF LONG LIFE

(By Ken Ringle<sup>1</sup>)

In Soviet Georgia, where people not uncommonly live more than a century, no one speaks of these people as "old" or "aged." The Russians refer to them as "long-living"—an emotionally neutral phrase from which Americans might profit.

For more and more we are a nation of relatively long lives ourselves—a culture from which medical technology has largely banished hunger and childhood disease and made possible the longest average life expectancy of any country in the world.

An American child born today can expect to live at least 71.3 years—24.3 years longer than a child born in 1900. Statistically, his chances of reaching age 94 are about the same—almost negligible. But what has changed dramatically is his chance of reaching 65—an age attained by only about 1 out of every 25 Americans at the turn of the century. Today 1 out of 10 Americans reach 65, and the average continues to inch upward.

By the year 2000, nearly 1 in every 5 people will be 65 or older. Their numbers will total close to 40 million people, more than twice the 1970 population of New York state or California.

Those numbers are about to wreak a profound change in our nation. What we are facing is what George L. Maddox, head of Duke University's Center for the Study of Aging and Human Development, calls "an emerging mismatch between our institutional arrangements in this country and that demographic fact—a mismatch we have not yet begun to come to terms with."

The ingredients and extent of the mismatch are staggering.

Born as a place of adventure, subdued by action rather than thought, the United States has always been a country of the young. In contrast to countries like China and Japan which showed great reverence for old people, even the native traditions here were less than supportive: Those too old to contribute to and follow the migrating Indian tribes were expected to wander off alone to starve.

Our medical philosophy has been geared toward keeping people alive (but not necessarily productive), our social institutions have been geared toward custodial rather than preventive care, our educational institutions have been geared toward vocational and professional training rather than lifetime learning, our transportation system has been geared to private vehicles rather than the public facilities on which the elderly must inevitably depend. Our suburban housing patterns have effectively shut the elderly out of our own lives and the lives of our children and our culture shuts them out of our minds by focusing on the immediate and the transient rather than that which endures.

Underlying our national life, in brief, has been the unstated assumption that old people weren't very important, they couldn't cope very well, and while we might owe them something in the way of social care, we didn't owe them much because there weren't very many of them and anyway they wouldn't be around too long.

The end of that assumption has been slow in coming. More than 10 years ago thoughtful economists were prophesying the impending bankruptcy of the social security system because of the growing number of old people. Most Americans who heard of the debate came away with the fuzzy notion that it somehow had to do with inflation. What it had to do with, of course, was the day when, thanks to the pill-born stabilization of our national birth rate, proportionately more people would be taking money out of the social security system than would be paying into it. Without major changes in the system, that day is not far off.

That threatened economic crunch, more than any other single factor, has been the moving force behind the current efforts to end mandatory retirement at 65.

It has also been the major force behind recent interest in the study of old age itself. For astonishing as it seems, though millions of man-hours have been devoted over the years to the study of how life begins, almost nothing had been done prior to 1950 on the study of how people change as it continues into the later

<sup>1</sup> Ringle is a member of The Post's metropolitan news staff. National staff writer Susan W. Stewart helped research this article.



years. What research was being done was almost entirely confined to the institutionalized aged—who, current studies show startlingly enough, amount to only about 6 percent of all those over 65.

The reason for the lack was largely rooted in the notion that "life is a terminal disease" and that anyone past the age of 60 was, in fact, in the process of dying.

Old people were stereotyped as feeble and sickly, senile and sexless—stereotypes that have become even sharper with many Americans in the age-segregated 1970s.

A year-long study of 180 school children by the University of Maryland's Center on Aging found that the children 8 to 11 typically viewed elderly people as "sick, sad, tired, dirty and ugly," and insisted that they themselves would never be old.

The stereotypes, the study found, were based on myths of aging centuries old, augmented in many cases by the treatment of old people in contemporary children's literature.

The most damaging thing about the aging myths is not, however, that they were believed by children but that in many cases they were and are believed by old people themselves.

"They are being told it's all downhill financially, it's all downhill sexually, it's all downhill intellectually," said Edward F. Ansello, associate director of the Maryland center, in making public the study last year. "They have this expectation of inevitable decline: If you live long enough you're going to be senile."

#### STRENGTH AND RESOURCEFULNESS

A growing body of research, however, continues to find no evidence that old age necessarily limits intellectual capacity, sexual activity or meaningful work.

The largest body of research has come from a longitudinal study of more than 200 elderly people performed over the past 20 years by the Duke University Center.

The study showed that far from meeting any depressing stereotype of decline, the vast majority of old people remained in good health, socially and sexually active with reasonable financial security and good mental acuity until the final weeks of their life.

"The characteristics they seem to suffer most from," said Duke Center director Maddox, "is the tendency of society to treat them as though they are all alike."

Old people in fact are extraordinarily varied. The evidence suggests that rather than becoming more alike as they grow older, old people become, if anything, more varied. But basically, when studied over a long period, as they were in Duke's study, old people show remarkable continuity of character: If a person is a healthy, happy person at 50, he will probably be a relatively healthy, happy person at 80.

Many old people, of course, do undergo serious illness and other painful crises associated with old age, from forced retirement to the loss of a spouse.

#### ADAPTING TO LONG LIFE

But more significant than the crises, according to Maddox, is the extraordinary strength and resourcefulness they exhibit in meeting these challenges of later life. This is the true "wisdom of age"; the fruit of a lifetime of problem-solving and learning to deal with loss.

What negative changes are associated with age, the research shows, are primarily associated with speed and perception: Eyesight and hearing dim, and physical and mental reflexes slow down appreciably, making some tasks like driving unwise for the very old.

But most oldsters also demonstrate greater patience with tedious tasks, less tendency to boredom and an impressive ability to compensate for many of those qualities that have been diminished by age.

In contrast to a frequent stereotype, old people actually tend to be sick less frequently than younger people, possibly because of a lifetime accumulation of immunity to various illnesses.

When they are sick, however, the illness tends to be more serious and they take longer to recover.

As for senility, the Duke study indicates only about 15 per cent of all old people ever become senile, and the larger portion of those due to an ailment called Alz-



heimer's disease which pebbles the brain with bits of hardened tissue and neurofibrillary tangles. Senility, the research shows, is not the result of age itself, but one symptom associated with several different diseases.

#### "MEDICAL PESSIMISM"

The portrait of old age that emerges from the Duke research and that of other gerontologists around the country is that of a huge portion of the American population composed of immensely varied individuals with an enormous store of unused potential for contributing to contemporary society.

It is this portrait that has provided much of the moral force behind current efforts to end mandatory retirement at age 65.

Beyond the retirement issue, however, lies an even more crying need—a need to rethink the very nature of our social institutions in the light of what we now know about the prospective numbers, the obvious needs and the demonstrated abilities of our growing population of old people.

Our national health care system, for example, is going to have to be radically changed, not because it would be a good idea, or because the traditional system hasn't worked, but because we can no longer afford to maintain even the inadequate system we have now.

In the process of concentrating our vast medical technology on conquering acute illnesses with dramatic impact, we have largely ignored the treatment of long-term chronic illnesses and the concept of preventive care.

It makes a great deal more sense for the government to spend \$5,000 on an individual over the course of his lifetime in preventing a chronic late-life illness than to spend \$100,000 at the end of his life trying to pick up the pieces.

The Duke study and others demonstrate that much of the physical dysfunctioning usually associated with old age is actually the result of organic ailments which doctors won't take the time to diagnose and treat.

Gerontologist Robert N. Butler refers to this as "medical pessimism" toward the elderly—an inclination to treat any complaint as the inevitable concomitant of old age.

Part of this is due to physicians' natural fascination with "quick return" medicine. Old people's ailments are often more difficult and time-consuming to diagnose, and oldsters respond to treatment less quickly than the young.

But part of it may also be due, some gerontologists believe, to inadequate knowledge by the average physician about the metabolism of old people and how it functions. Too little is known about what constitutes "normal" aging.

There is some indication, for example, that some high blood pressure in old people may actually be needed to force blood through less elastic vessels of the aged. When physicians prescribe medication to lower blood pressure, they may actually be restricting the blood flow to the brain, thereby bringing on senility.

As for senility itself, many of the mental aberrations attributed to it may be reversible symptoms brought on by a wide range of factors ranging from infection to malnutrition.

#### CHANGING INSTITUTIONS

It is obvious that a wider body of knowledge on the physiology of aging is needed. But needed even more is a national program of health care designed to carry that knowledge and the medical care it inspires to the people who need it most. Most gerontologists believe this can be done with a program of preventive care that keeps old people out of institutions and active in the community.

Twenty-eight years ago New York's Montefiore Hospital launched a program of home care for the elderly which featured regular visits to the homebound by doctors, physical therapists and social workers. In the years since, some 100 other hospitals in the nation have set up similar programs. Two years ago, Montefiore helped set up a day hospital program offering custodial care to elderly patients who have no one at home to look after them during the day.

Such programs could be encouraged by state and federal legislation as a more human and more successful alternative to Medicare-subsidized nursing homes, at less than half the cost.

Similar imagination is needed in a program of income maintenance in the face of inflation that is eroding fixed social security incomes too close to the poverty level. Many experts recommend placing a floor under retirement incomes, pegged to the actual cost of living, financed either by increased social security taxes or other state and federal funds.



Housing is another area which helps make it hard to grow old. When America was an agrarian nation, houses were larger and designed for an extended family of three or more generations. Old people never really retired, but contributed to the family unit and received from it as their abilities and needs warranted. The advent of social security and the FHA brought with it more familial freedom and mobility but also spawned a proliferation of houses and a suburban lifestyle seldom conducive to home-based care of the elderly.

Many gerontologists, however, see a return to the extended family as an inevitable consequence of the aging of America. Some 80 percent of the old people surveyed in Duke's 20-year study had at least one child living within a 30-minute driving time and most had significant interaction with their families.

Duke psychologist Daniel G. Blazer sees federal encouragement for programs of family care as a natural outgrowth of the determined emphasis on family life in the current Carter administration. Such a program might take many forms, including rent, mortgage or construction subsidies for families caring for older relatives and tax incentive programs for home-based care of the elderly.

Such a concept, he said, would help end the sense of social isolation felt by many institutionalized old people and permit a return to the fruitful contact between young children and older relatives which has become increasingly a casualty of our age-segregated society.

Other institutions will also have to change. Legislators wavering in their support of public mass transit systems might contemplate what life will be like when thousands of their constituents—and they themselves—are too old to drive.

The educational community will have to rethink its long-term emphasis on youth and provide more in the way of creative, unstructured lifetime learning programs for people of all ages. Britain's "open classroom" program, which utilizes television and community learning centers as well as home programs, has been a model in this regard.

#### SIGNS OF PROGRESS

Much, of course, is being done. Included in this year's Labor-HEW appropriations bill is an unprecedented \$500 million for spending under the Older Americans Act, chief vehicle for research, community services and nutrition programs for the elderly.

In addition to the main HEW appropriation, up \$75 million from last year, funds are flowing toward the elderly along other routes. Among them:

*Jobs:* Two measures of Carter's economic stimulus package, signed into law last spring, are designed to help older workers find jobs. The total federal outlay: \$160.5 million.

*Housing:* \$82.5 million will be spent by the Community Services Administration to weatherize homes belonging to the poor, elderly and handicapped. Some \$200 million will go to help low-income people pay for last winter's fuel bills and \$100 million for continuation of a loan authority program for housing for the elderly.

*Education:* Some \$2.7 million is going toward further development of "Over Easy," a public television series designed to inform, educate and entertain the elderly.

*Research:* \$2 million has been appropriated for the Center for Studies of Mental Health of the Aging. The National Institute on Aging will probably get \$39 million, an increase of \$5 million from last year's funding.

This is hardly a complete list of the various federal appropriations aimed at the elderly but it is indicative of government expenditures in the area. Add on the enormous cost of Medicaid and Medicare benefits. Supplemental Security Income, food stamps and the like and the true cost of old age to our society begins to become apparent.

Then there is the organizational attack: the President's Council on Aging, HEW's Administration on Aging, a Federal Council on Aging, a House Select Committee on Aging and a Senate Special Committee on Aging.

But more crucial than the dollars and the committees and the institutional changes to the future of aging in America, gerontologists believe, is an attitudinal change on the part of the American public: an awakening to the realization that "ageism," like racism and sexism, endures through the sort of dull, insensitive thinking that debases both young and old, and a challenge to make the increasing years of later life not only possible but enriching for every American.

It is the most brutal sort of self-interest for today's decision-makers to help



do so. For the old people who will have to live with what we do or don't do today will include most of those reading this article.

This is a true or false test devised by Dr. Erdman Palmore of the Duke University Center for the Study of Aging and Human Development to test public awareness of facts about old people and aging. Key to answers is at the end.

1. The majority of old people (defined as those over 65) are senile. True ☐ False ☐
2. All five senses tend to decline in old age. True ☐ False ☐
3. Most old people have no interest in, or capacity for sexual relations. True ☐ False ☐
4. Lung capacity tends to decline in old age. True ☐ False ☐
5. The majority of old people feel miserable all of the time. True ☐ False ☐
6. Physical strength tends to decline in old age. True ☐ False ☐
7. At least  $\frac{1}{40}$ th of the aged live in extended care institutions (nursing homes, mental hospitals, etc.) True ☐ False ☐
8. Aged drivers have fewer accidents per person than drivers under age 65. True ☐ False ☐
9. Most older workers cannot work as effectively as younger workers. True ☐ False ☐
10. About 80 percent of the aged are healthy enough to carry out their normal activities. True ☐ False ☐
11. Most old people are set in their ways and unable to change. True ☐ False ☐
12. Old people usually take longer to learn something new. True ☐ False ☐
13. It is almost impossible for most older people to learn new things. True ☐ False ☐
14. The reaction time of most old people tends to be slower than the reaction time of young people. True ☐ False ☐
15. In general, most old people are pretty much alike. True ☐ False ☐
16. The majority of old people are seldom bored. True ☐ False ☐
17. The majority of old people are socially isolated and lonely. True ☐ False ☐
18. Older workers have fewer accidents than younger workers. True ☐ False ☐
19. More than 15 percent of the U.S. population is now age 65 or over. True ☐ False ☐
20. Most medical practitioners tend to give low priority to the aged. True ☐ False ☐
21. The majority of older people have incomes below the poverty level (as defined by the federal government). True ☐ False ☐
22. The majority of older people are working or would like to have some kind of work to do (including housework or volunteer work). True ☐ False ☐
23. Older people tend to become more religious as they age. True ☐ False ☐
24. The majority of old people are seldom irritated or angry. True ☐ False ☐
25. The health and socioeconomic status of older people (compared to younger people) in the year 2000 will probably be about the same as that of today's older people. True ☐ False ☐

*Even-numbered statements are true; those with odd numbers are false.*



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