UNITED STATES
DEPARTMENT OF AGRICULTURE

In the Matter of:)
)
NUTRITION AND AGING:)
LEADING A HEALTHY, ACTIVE LIFE)
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2000 MILLENNIUM LECTURE SYMPOSIUM)

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THE UNITED STATES DEPARTMENT OF AGRICULTURE
CENTER FOR NUTRITION POLICY AND PROMOTION

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2000 MILLENNIUM LECTURE SYMPOSIUM)

The Jefferson Auditorium
South Building
14th & Independence Avenue, SW
Washington, D.C.

Thursday,
September 28, 2000

The meeting in the above-entitled matter was convened, pursuant to notice, at 9:05 a.m.

PRESENT:

DAN GLICKMAN
SECRETARY OF AGRICULTURE

SHIRLEY WATKINS
UNDER SECRETARY FOR FOOD, NUTRITION AND FOOD SERVICES

JULIE PARADIS
DEPUTY UNDER SECRETARY FOR FOOD, NUTRITION AND CONSUMER SERVICES

JEANETTE TAKAMURA
ASSISTANT SECRETARY FOR AGING, DHHS

RAJEN ANAND
EXECUTIVE DIRECTOR, USDA CENTER FOR NUTRITION POLICY AND PROMOTION

PRESENTERS:

CONNIE W. BALES, PH.D, R.D., L.D.N.
BRET H. GOODPASTER, PH.D
TAMARA R. HARRIS, M.D., M.SC.
MARY ANN JOHNSON, PH.D.
ALICE H. LICHTENSTEIN, D.SC.
IRWIN H. ROSENBERG, M.D.
MARY FRAN R. SOWERS, PH.D.
BARBARA C. TILLEY, PH.D.
NANCY S. WELLMAN, PH.D., R.D., FADA

P R O C E E D I N G S

(9:05 a.m.)

MR. ANAND: Good morning. I want to apologize for the delay at security. I know that there is a long line of people still waiting. This is the procedure, and we cannot do anything about it.

We are delighted to welcome you and those who are watching this on the Web site. This is the fifth in a series of Millennium Symposia. We actually started with Child Obesity, Breakfast and Learning, Dietary Behavior, and the Great Nutrition Debate. Now these events have been successful largely because of your support. And I want to thank all of you for supporting these symposia.

Now the purpose of these symposia is actually to provide you with the latest available scientific information on the subject, to increase the awareness of the issues, and to examine how the new size could influence the nutrition policy. And I believe that we have accomplished all of these goals.

Before we held the Child Obesity Symposium, little attention was being paid to this growing epidemic. It is now gratifying to see that everybody is talking about child obesity, and many steps are underway to understand this condition.

The topic of this symposium, Nutrition and Aging, should also prove to be a fascinating one. Today we are living

longer, and want to have a healthy and productive life. The number of 35 million over age 65 will double in the next 30 years as Baby Boomers join this group. By 2030, the number of people aged 100 or over is expected to increase five-fold. This extraordinary growth will have a huge impact on the nation's social and medical services, and will bring new challenges. The speakers today will address many of these challenges.

Our center staff has worked very hard to put together this event. At this time, I would like to acknowledge of the efforts of especially Mr. John Webster, Nancy Gaston, Charlotte Pratt, Shirley Gatier, Jenny Fleming, S.C. Yameni, Kristin Marco, Desaun White, Kim Thigpen, and Andy Fitzgerald. Nadine Sahuhu is now at the University of Maryland, and played an important role before she left us.

The cooperation provided by the Florida International University and the American Dietetic Association is gratefully acknowledged.

It is now our great pleasure and indeed an honor to present to you a truly inspiring leader, Under Secretary Shirley Watkins, whose vision and personal interest in these symposia has really made them successful. Please welcome Shirley Watkins.

(Applause.)

MS. WATKINS: Thank you, Dr. Anand. And I want to

welcome all of you here this morning for another symposium to talk about something that has been on our minds for some time. And I do not know if it is because I am getting older and Raj is getting older, or what it is. But we certainly want to recognize the importance of looking at the dietary behavior, and the health and nutrition of the aging population.

As Raj has indicated, this population is scheduled to grow, as the Baby Boomers reach another milestone in their lives. And we need to find out what the policy implications are. The work that you have done across this country in looking at the aging population as it relates to nutrition will add immeasurably to the success of policy people through this country, and particularly here in Washington.

And I want to recognize those people as Raj has already said on the staff who have worked so hard. And to those of you who have joined us today who have been studying this issue, the scientists who are here. You have been studying this for a long time. And the work that you have done will help us to make some decisions as to how we move forward in addressing this here at the Department of Agriculture.

One of the major reasons for our success in the nutrition arena here at the department is because of the support and the responsibility that the Secretary of Agriculture has. I know that many of you sitting in this audience understand what it means to have the leader at the

cabinet level so concerned about nutrition and the programs that we are responsible for.

Secretary Glickman has been for years interested in nutrition. And over the past three years, I can assure that he is a staunch supporter of nutrition programs, which have helped to improve the lives of millions of children and families across this country. He has led the fight to put the issue of hunger firmly in the public eye, and has been tireless in making sure that our nutrition assistance programs grow and thrive.

Someone once said that age does not depend upon the years, but upon the temperament and the health. Some men are born old, and some never grow. Dan Glickman is a shining example of someone who will never grow old, but whose temperate and policies will help us to make the right decisions. It is my honor to introduce Secretary Dan Glickman. Secretary Glickman.

(Applause.)

MR. GLICKMAN: Thank you, Shirley. I may never grow old, but some people think my jokes may grow old.

(Laughter.)

MR. GLICKMAN: It reminds me, and I was thinking about it. There was a story about this man who was about 80 years old, who decides to get married for his fifth or sixth time. And he finds a young woman who is about one-fourth his

age, and she is about 20 years old. So she strongly suggests that they go in and each have a physical examination. So they go to the doctor, and the doctor gives them a physical examination, and then brings them both back in.

And the doctor says, "Well, I have examined you both, and things seem to be okay. But I am really worried about this age difference." And the man looks at the doctors and says, "Well, Doctor, if she dies, she dies."

(Laughter.)

MR. GLICKMAN: And it does show you that your outlook and your mental attitude has probably as much to do with your perspective, and your health and life.

I want to thank Shirley for her leadership and Raj Anand for putting these things together. And I want to welcome Jeanette Takamura to the department. We thank you. You have a very, very important role in terms of these issues.

Some people often ask me why is the Department of Agriculture involved in all of this stuff. And it is very interesting. Yesterday, we created what was called a Hall of Heroes here. And our heroes, we had Smokey the Bear, and we had George Washington Carver who was a research scientist here. And the father of the soil conservation movement, a gentleman named Hugh Hammond Bennett.

And the fourth award went to Senator Bob Dole. And, of course, he is from my own State of Kansas, and he was the

head of his own party, and a presidential candidate. I told him many times that I owed my job to the fact that he was not president of the United States. But he was a good friend, and he was one of the first to recognize the link between food production and nutrition. And he along with George McGovern and Hubert Humphrey were basically either the author of or the radical expander of the programs that make up the majority of our budget.

We are often known as the farm agency. But the overwhelming majority of the budget of the Department of Agriculture, 65 percent, $37 billion a year, is in food stamps, school lunch, WIC, and commodity programs. They dwarf everything else that we do in terms of program expenditures. So this is a big part of what this department does, it is on those kinds of issues.

And we are trying to push the envelope there as well. We have expanded the school meals program. We have made them over the last several years more quality based programs rather than just quantity based. So we actually do care what kids are eating. And it is better than it used to be, I want you to know that, in terms of the nutritional composition of the meals.

We have added a universal school breakfast pilot program. A finding that many kids, not just poor kids, but middle income and upper middle income kids will go 18 hours

sometimes without any meal, between dinner and lunch the next day. And we think that it affects their behavior and their performance.

We have expanded our women, infant and children's program under Shirley's leadership. And we are working to increase food stamp awareness. And HHS is doing the same thing. And I am sure that Jeanette will talk about that as well.

We are also confronting new questions about nutrition, about what you eat. Not only about how much we eat, but how it affects your health, how it impacts disease prevention, and what role exercise plays, and more. And we have held several symposia here.

We held one on childhood obesity. The figures are alarming on childhood obesity. But not just childhood obesity, but adult obesity. The rapid increase in diabetes, the almost epidemic increase in diabetes in this country is largely, I think, a diet and exercise related phenomenon. It does not get the public health attention let's say that smoking gets. But in fact, it may affect more people's lives on a day to day basis than smoking does. And that does not minimize the terrible effects of smoking. But I am just saying that diet and exercise probably play a greater role in most people's lives.

And so we have been involved in those issues, and

people are actually doing something about it. I read yesterday about a school district in New Jersey that is making it harder and more expensive for kids to buy french fries as part of their lunches. Encouraging them to eat fries in moderation, and choose more nutritious foods. The fact is that the french fried potato is the prime vegetable for most kids.

And I am not against potatoes. I love everything that is produced in this world that every farmer works hard to produce. But everything has to be eaten sensibly and in moderation. And we have held other symposia here.

We want to look into the efforts of our surroundings on our food choices, such as easy access to vending machines, or the atmosphere in school cafeterias. And we want to investigate dietary behavior, why people choose the foods that we eat.

Earlier this year, we had the great nutrition debate, where we had people like Dr. Atkins, and Dr. Ornish, and the other major diet gurus in this country. Where we held a somewhat provocative and emotional discussion about whose diet was better, and whose diet could make you lose weight. And quite frankly, whose diet sold more books. But the fact is that a lot of Americans get their information through the media and through these kinds of sources. And we want to figure out what kind of information are they are getting, and are there ways to test these diets to see if they in fact work over the

longer term or not.

And last May, we held a National Summit on Nutrition. It was an interesting time. Because I was on the podium with Secretary Shalala, and Senator Dole, and Senator McGovern, where somebody threw a tofu cream pie at me under the theory that I was, I think she said "a pimp for the meat industry." And the pie grazed me on the back. I ducked very quickly. To which I turned her and I said, "That was not a very balanced meal that you threw at me." And I looked back at Bob Dole. And I said, "Bob, I do not think that we are in Kansas any longer."

(Laughter.)

MR. GLICKMAN. You know, people do feel very strongly about food. I do not think that there is anybody here in this audience that looks that provocative today. I certainly hope not. But the thing is that we are raising questions and looking for answers.

To a large extent, these issues have gotten only surface attention until the last several years, but they need to be raised. And we are raising them in our efforts to look at the Food Guide Pyramid, and guiding people in choosing a healthy and balanced diet. Or the recent Dietary Guidelines for Americans working with HHS and USDA, where we try to bring the latest scientific research into diet, exercise, and disease.

Today, we are releasing a new consumer version of the Dietary Guidelines, which may be outside actually. I do not know if we have got any or not. And that is a short consumer friendly version of the ten guidelines that give people a clear understanding of how nutrition and the food choices they make play a role in promoting good health. And granted, it is not terribly complicated, and it does not go into great detail. But it can be helpful to a lot of folks as they make their food choices.

But we need to continue to push nutrition's frontiers and ask the tough questions, and that is why we are here today. There are a lot of Baby Boomers in this room including myself, and we are growing older. With the number of people over the age of 65 expected to double by the year 2030 from 35 million to over 70 million, we need to look at how nutrition and exercise affect how we age.

And the fact is that this is a very great problem. And I am going to give you some personal anecdotes as I see them. But the fact is that among older people that we see increases in obesity, and depression, and osteoporosis, and greater challenges to hearing and sight. We are concerned about the reduced intake of nutritious foods due to factors like living alone, no support base, no spouse, no children, poor dental health, poverty, disease, and just bad dietary habits.

So we have got to figure out how we adopt the things, like the Food Guide Pyramid, or Dietary Guidelines to older Americans and people living in isolation. How do we raise awareness among older people about the relationship between diet and disease. How do we get older folks to exercise, and change their entrenched habits that they have had. To put it another way, how do we teach old dogs new tricks.

And there is another part of this thing too as well. And that is there are a lot of folks here from the medical community. And the fact is that I am convinced that these issues of nutrition and health care have historically gotten very short shrift from doctors and from other health care providers.

The general idea up until maybe five or ten years ago was to treat you horizontally rather than vertically. And that is something that has got to stop. I saw it with my own parents, who passed away last year. They felt that as they got older, that the attention to their health care declined. That in fact you are getting older, and these are things that are going to happen to you, and you just have to live through them, bear with them. And fortunately, they had a support base among themselves and had children to deal with. But a lot of folks do not.

And we have got to figure out how to energize the health care community into realizing that diet and nutrition,

particularly with older Americans, is a big part of maintaining health and the quality of life.

Anecdotally, I was just downstairs having breakfast with somebody who told me the story about his father, who is a very elderly man and who had a heart attack. And because of circulatory problems, he lost vision in one eye. And the other eye was being clouded by a cataract.

To make a long story short, the doctor said, "I can take care of the cataract, but you are getting the first symptoms of macular disgeneration," which, of course, is very frequent among older people. "And we can perhaps treat this with some medication." But he said, "The best treatment is extensive consumption of green vegetables." He said that they have something here, I think it is lutein, but I am not exactly sure what it is. And he said, "Which can slow down, it cannot stop, but in many cases, it can slow down macular degeneration." This man went to ten doctors before he found one person who said, "Eat your green vegetables. It might help you slow this down."

And I am wondering how many medical care providers, whether they are physicians or others, nurse practitioners, physician assistants, you name it, who are in the system, really are focused on how nutrition can make a big difference, whether it is calcium or magnesium in the diet, or all of the kinds of things that can maintain lifestyle.

And I just do not think that this has a very high priority in this country, but it will. Because as all of us get older, the folks in this room have a lot of political clout as well. And that is going to make a difference in terms of changing attitudes and perspectives, in terms of aging, nutrition, and diet.

So I have pontificated long enough. I do believe that this symposium is a time to start and to ask tough questions to challenge not only us. You know, the government has a somewhat limited role in all of this. We can provide information and help facilitate things. But ultimately, it is up to the private sector, and the business community, and the medical community, and the social service community, and the research community to really focus in on this.

It was Benjamin Franklin who said, "You are what you eat." And what you put into your mouth has more to do with your health than anything else we do, anything else we do. And we kind of wait until we get the disease before we decide what to do with it.

So as people are living longer, we find all sorts of miracle cures, drugs, and all sorts of things. By the way, one of the things that we are working on here is combining foods with pharmaceuticals. So when you eat that tomato, it might have in fact some genetic modification that in fact you can improve your quality of life by radically increasing your folic

acid content, or your magnesium, or your calcium, or those things. I think that is going to be a new thing in the future. And it is rather controversial, genetic engineering. But more and more, I think that you are going to see nutri-ceuticals as part of the food industry.

But the big thing here is that is the longer term, and the shorter term is to work on those things that we can educate folks. So Americans, as they are aging, can know that they can get the benefits of the safest, and most bountiful, and most nutritious food supply in the world. Nobody should have a shortage of food in America. We produce one and a half times or two times more than we need to consume of everything. Fresh fruit and vegetables, meat, poultry, dairy, you name it, grains. So everybody should have access to that food. And maybe this conference will help older Americans realize the benefits available to them. Thank you all very much.

(Applause.)

MS. WATKINS: Secretary Glickman, thank you so very much. And we are delighted that you are going to be able to spend a few minutes with us, as you have to run off to another meeting.

I also want to recognize the presence of Ed Cooney, who is the special assistant to the Secretary on nutrition issues. I saw Ed a few minutes ago.

And Carl Willick, who is the White House liaison and

represents the President of the United States. Carl, we are delighted you are here.

Mr. Secretary, as we listen to your comments and reflect on those, one of the reasons that we went up to visit at Tufts several months ago, to visit with Dr. Rosenberg and the staff at Tufts, was to find out -- Irv, if you could just tell me, what is the relationship of what is happening to seniors, as you have studied senior issues for a number of years, what is that relationship to our children, is there something that we need to be doing at a very early stage that would minimize the impact on seniors?

Irv and I had some long conversations, and many wonderful exchanges of ideas with the staff at Tufts. What is the impact?

We do not have the sole responsibility for senior issues here at the department, but we have some flow through money that goes through our hands in helping seniors. And one of the other interesting things that we had the opportunity to do was to spend some time with HHS and talk about how can we help, what is it that we need to be doing that we are not doing.

The partnership that we have been able to establish with HHS and with our partners at USDA in looking at this issue and trying to determine what is our role, what is our responsibility in working with children in the WIC program, and

working with children in the school meals program. So that we can make sound policy decisions and try to figure out what is it that policy officials can do, as we look at eliminating and preventing some of the long term health issues.

Well, Jeanette Takamura and I had an opportunity to spend some time together in scouting out over the country and finding what are seniors saying after we had talked with Tufts. What is it that they would like to see us do.

We had listening sessions together. And Jeanette's staff and my staff had some interesting conversations with seniors across this country, as they said to us, "I don't have the money to buy food, because I have to use money for prescription drugs."

This was very interesting for us as we moved across the country. And Jeanette and I thought that we need to further our discussion and make certain that we are doing a better job of communicating with people, and how we can help with these programs.

So it is my pleasure this morning to be able to introduce Jeanette Takamura, who is the Assistant Secretary for Aging with the Department of Health and Human Services. Jeanette was sworn in December of 1997 to oversee the Administration on Aging, which is the focal point and the advocacy agency within the federal government for older Americans.

Recognizing that there will be an upsurge in the number of older persons in the 21st century, AOA is dedicated to preparing the nation to meet these challenges, and use the opportunities presented by the longevity of its people.

Jeanette Takamura was the first deputy for the Hawaii department of health. Prior to becoming the Assistant Secretary for Aging, and before joining the state government of Hawaii in 1987, she was on the faculties of the School of Medicine and the School of Social Work at the University of Hawaii. She has served on numerous and international advisory councils and boards including the 1995 White House Conference on Aging. She received her Ph.D in social policy from Brandeis University.

Please join me in welcoming Dr. Jeanette Takamura.

(Applause.)

MS. TAKAMURA: Good morning. It is a pleasure to be here this morning. I would like to thank Secretary Glickman and Under Secretary Watkins for their leadership, and for the invitation to join you today. And my special thanks to my friend and colleague, Dr. Rajen Anand, and the staff of the Center for Nutrition Policy and Promotion for all of their work on the symposium.

I realize that it is relatively early in the day, but I am going to ask you to just indulge with me for a few minutes. Please, if you do not mind, imagine along with me an

extraordinary piece of apple pie. I chose that one, Secretary Glickman, because I did not want it to be cream tofu.

(Laughter.)

MS. TAKAMURA: Imagine with me the aroma of freshly ground cinnamon and nutmeg going through this auditorium, warmed by the sweet juice of succulent slices of baked delicious apples bursting out from between flaky golden crust under a mound of creamy ice chip speckled vanilla ice cream. And accompany that with a cup of Kuana coffee from my home state with its rich earthy bouquet. Can you get into that?

Food has so much symbolic value for all of us, whether we are young or old. It means contentment, nourishment, security, health, family, abundance, love, fun, enjoyment, survival, control, but it can also mean disease and obesity.

A meal is more than nutrients. It is the basis for a healthy and active life. And for many older Americans, the meal that the Aging Network serves on meals or in its community settings is the only meal for the day. Together with the USDA, and this is the reason that I am so glad to be here, the Administration on Aging funds a spectrum of nutrition programs all across the country for hundreds of thousands of older folks, that were it not for this meal program they would not eat. And this, of course, is the Elderly Nutrition Program.

But if you think that there are many older Americans

today, then let me note that our population of older persons will nearly double in the decades ahead.

Recently, I had the incredible honor of introducing Mark Powell, a centenarian, at a national event. Mr. Powell, an African American, retired at age 91. One of his many careers lasted 28 years, and some of us are still trying to make 20 in the federal government, I think. Another one of his careers lasted 25 years. And at 102 years of age, Mr. Powell is active and engaged in his community, and with his 22 great, great grandchildren. Can you believe that?

He is an example of the kind of vigorous older American that each one of us in this auditorium hopes eventually to become. Mr. Powell is among a previously unimagined number of people growing to an advanced old age in America, and indeed in the world.

The implications and profound impact of human longevity upon virtually every facet of our lives are just staggering. In just one century, our life span in the United States has been extended by almost 30 years. We have gone from an average life expectancy of only 47 years in the year 1900 to 76.7 years for a child born in 1998. And I know later today that you will hear a lot about the centenarians who are joining the ranks of our older Americans in increasing numbers.

Improvements in nutrition and public health, improvements in the environment and standards of living,

occupational safety and labor laws, increased educational and economic attainment have all contributed to the most dramatic change in American society in this century.

As of June 2000, there were almost 34.8 million persons 65 years of age and older representing about 12.7 percent of the U.S. population, or about one in every eight Americans. After growing at a modest pace over the next few years, our population will absolutely burgeon between 2010 and 2030. These are the years during which the baby boom generation, and I am proud to be one of the boomers, will reach age 65.

By 2030, there will be about 70 million, not 34.8 million, but 70 million older persons, double the number, in 1999. People 65-plus will represent almost 20 percent of the population in 2030, up from nearly 13 percent today. That is one out of five people.

Go to a shopping mall during the work day. Do not take time off from work, but find another way to get there. And I will tell you that you would just be absolutely amazed, because the shopping mall is literally inhabited by older folks who spend much of their day there in many instances.

As we anticipate the growth in the number of older Americans, we will need to remember that to grow old is to grow less alike, not to grow more alike. There are between generational differences and within generational differences

among older Americans for example. If anything, we are almost similar at birth. With time and differing life experiences, different socioeconomic status, health histories, work histories, geographical affiliation and others, we become more and more different as we become older.

In terms of racial and ethnic diversity, minority elders are expected to account for 25 percent of the U.S. elderly population in 2030, up from 16 percent in 1998. Between 1998 and the year 2030, the white non-Hispanic population, 65-plus, is expected to increase by only 79 percent compared with 220 percent for older minorities.

By the middle of the 21st century, every third older person will be from a minority group. Some sociologists have said that we will see the feminization of society as we grow an older population. In June 2000, there were 20.3 million older women and 14.5 million older men, or a sex ratio of about 141 women for every 100 men. This sex ratio increases with age ranging from 118 for the 65 to 69 group to a high of 233 women to 100 men for persons 85 years of age and older.

Now one futurist actually had the audacity to suggest that we will in fact see a society in which there will be many women for every man. I have a good friend in Hawaii who had the wisdom to suggest that when she and a bunch of my friends, all baby boomers, become older folks, we would move into her home, because she happens to live right on the beach, and we

would each occupy one of her many bedrooms. And that we would invite, all of us women, one man to live with us. And that man, not her husband and not my husband, would be our hairdresser.

(Laughter.)

MS. TAKAMURA: Well, that 10.5 percent of all older adults were in poverty in 1998. This percentage rises to about 14.2 percent among those 85-plus. And most of those in poverty, my friends, are older women, many of whom live alone in the community. For many women, the older we get, the poorer we get, and the more vulnerable we are.

This is why a decent minimum wage, family care giver support, and other measures are so very, very important.

Since we are at a nutrition conference, let me say this. Poverty affects choices. Shirley and her staff and my staff and I, we have all seen that poverty affects choices. It affects the quantity and quality of the food consumed. Not having enough food or having food at all, not having enough nutrients, all of these things affect health.

The special vulnerability of women is readily apparent whenever you visit a nursing home. Women who have cared early on for their children and later on for their spouses, and their parents, and their friends, and their neighbors frequently are without the support of others in their older years.

For those who are unable to remain in the community, a home delivered meal, or being able to count upon a meal in the community can make an enormous difference. It means being able to eat that one meal a day. It means being able once during the day to have some human contact and some social interaction.

In the Administration on Aging, we have carried a consistent message, one that is reflected in our reauthorization proposal for the Older Americans Act. That is that it is possible for many of us to prepare now for our older years. We also believe, as Secretary Glickman said, that it is absolutely imperative for each of our federal agencies to work in partnership with the private sector to provide essential leadership as we anticipate the aging of America.

We can take steps now to ensure that everyone knows what risks to expect in one's older years. And when I say everyone, I also mean kindergarten kids, who tend more oftentimes than other folks to have a tremendous amount of compassion for their grandparents and other older folks that they meet.

We can take steps to ensure that people plan for their life course, to give people a chance to build financial security. More and more of us can choose to save with the economy flourishing as it is today. We can also reduce the incidence of diseases and disability. We can eat right, and

exercise regularly. We can adopt healthy lifestyles and make the possibility of active successful aging a reality for all Americans.

As a nation, we have a prevention agenda, a road map to better health for all in Healthy People 2010. And I know you are going to hear about Healthy People 2010, so I will not spend a lot of time on it. But let me just say that 274 of Healthy People 2010 objectives are related to older adults. They are grounded in science, built upon public consensus, and designed to measure progress.

There are two central goals. To increase the quality in years of a healthy life. And secondly, to eliminate health disparities. One way that Healthy People 2010 seeks to increase life expectancy and quality of life over the next ten years is by emphasizing the importance of knowledge, motivation, and opportunities, to make informed decisions about one's health including wise food and physical activity choices daily starting right now irrespective of how young or old you might be.

Habits and choices made at younger ages help form the foundation for successful aging. And I think that you heard from Shirley Watkins about the importance of working with young people. Because young people hopefully will age and become older folks.

The dietary guidelines for Americans 2000 recently

released by the Secretaries of the Departments of Health and Human Services and Agriculture contain a wealth of simple, clear, easy to understand advice, to help each and every one of us with these decisions. For the first time, these guidelines contain more specific advice for older adults.

And because of that, I really do want to thank all of the advocates who are in the room. From Jean Lloyd in the Administration on Aging to Shirley Watkins who is the Under Secretary for Agriculture, to Nancy Wallman. And certainly Irv from Tufts University, and all of the others who I am not naming, Dr. Lichtenstein and others, who daily fight the fight to make sure that we remember that older folks need to be healthy too.

In the Aging Network, we have long recognized that the diversity of America's population, including older adults, is one of our greatest assets. But diversity also presents a wide range of health improvement challenges. They are challenges that can be addressed by individual states and communities and the nation as a whole. There is increasing diversity and a need to get the right information and services to the right people at the right time in the right setting.

Shortly, we will be announcing the award of four grants. One each to support planning activities in the African American, Asian American, Hispanic American, and Native American communities, to design culturally appropriate health

promotion, and disease prevention strategies and mechanisms to be aimed at older minority persons.

Annually, the Administration on Aging provides funding to states for a spectrum of supportive services for older persons. And we are hopeful that we will see Congress enact a proposed national family care giver support program in the remaining weeks of the second session of the 106th Congress. Because as much as older folks have needs, we know that so many family care givers are struggling to balance work, their personal lives, and being care givers.

My friends, longevity is here to stay. I am so grateful to have partners like Shirley Watkins, Rajen Anand, and all of the individuals that I mentioned a few minutes ago. Longevity is a gift. It is a gift that we have never had before. And I can say to you with a tremendous amount of confidence that the future is aging. If more and more young and older persons adopt healthy lifestyles, including eating right and keeping physically active, life will not just be long in America, it will also be good.

There is much that we can do to prepare for the future. I extend an invitation to you. Come join with us in the Administration on Aging. I believe that the best is yet to be. Thank you very much.

(Applause.)

MR. ANAND: Thank you, Jeanette, for your inspiring

remarks.

We are going to start with a scientific overview on healthy aging. And that will be given by Dr. Tamara Harris. Dr. Harris is Chief of Geriatric Epidemiology with the National Institute of Aging, and is also a Commander in the Public Health Service.

Her recent research has examined the longitudinal association of vascular and Alzheimer's dementias, diabetes, and glucose intolerance; diagnostic criteria for diabetes mellitus in older adults; body weight, weight change and incidence of self-reported physician-diagnosed arthritis among women; as well as depression in older people.

Dr. Harris has a B.S. in sociology-urban studies at Boston University, a M.S. in nutrition at the Institute of Human Nutrition-Columbia P&S and in epidemiology, Harvard School of Public Health, and her M.D. at Albert Einstein College of Medicine.

Please join me in welcoming Dr. Harris.

(Applause.)

DR. HARRIS: Thank you. First of all, I wanted to thank you for the opportunity, thank the USDA for the opportunity to come here this morning, and to talk about an overview of healthy aging. Before I start, I wanted to point out that the federal interagency forum on aging related statistics has a very nice volume that is available to you. It

is called Older Americans 2000, Key Indicators of Well-Being. And I am not actually using data from this, but I think that it is a very nice summary of the number of federal databases and other studies that have been carried out that provide indicators on health of older Americans. So I wanted to recommend it to you.

Now let me just get started here. I am going to give a brief overview of healthy aging, and then talk about a study that we are doing that I think will augment and complement other studies that have investigated healthy aging.

Now actually, if we could dim the lights a little bit, so the slides can be seen more sharply. Now if we go back even 15 years and we think about research on aging, 15 years ago, I think that this woman represents what people thought about when someone said old age. That is someone who seems to be a bit frail and disabled. If you notice, she is likely to have osteoporosis. My favorite part of this slide that she only reaches the door knob. She is at home. She is not dressed in street clothes, suggesting that she does not need to go out. If you look at her feet, she has slippers on.

This was really the view that we had of aging. And if you said what happens to people when they turn over age 65, this is sort of the view that came into people's minds. And I think that this is because we were very focused on the older Americans who were driving health care costs and driving costs

in the budget. But in fact, in the older population, we are seen at relatively homogeneous. That is one group moving in rank step through old age into health outcomes.

But in fact, over time, we now have the recognition that older age does not equal disease or disability. That there has been a gradual, as one of the noted gerontology researchers, John Roche, said, "A peeling away of the onion." So we are actually approaching the core of understanding what aging process is, and what are the aspects that are related to behavioral, environmental, and genetic exposures that we have an opportunity to address, so we can change and allow us all to reach old age and better health and more be active.

We gradually developed the recognition that there are older individuals like these ladies who we might call "usual agers" who have a number of medical conditions, but are living a very nice quality of life. And even individuals like this older gentleman, who might be considered a successful ager, who in old age is actively participating in sports despite being quite elderly.

And we developed a view that as was mentioned earlier that old age is not one population, but it is actually at least three separate populations. And that these populations are distinguished by their pattern of exposures and the kinds of behaviors and environmental exposures that people have had that have taken them through mid-life into old age, and that their

pattern of health outcomes in old age is really determined by their health status and their functional status.

So we have older people who may be considered successful, that have relatively few health conditions and maybe some risk factors and very little functional problems, usual agers, and frail elderly.

In addition, we now have a series of studies, which have begun to address the different characteristics of these populations, and to understand the risk factors that allow us to move from one population to another. So we have the MacArthur study of successful aging, which has addressed the question of what the characteristics of successful agers are. We have many population studies that have looked at usual agers, and we will be hearing about some of these later on, especially with regard to nutrition.

And then we have population studies which are really targeted at looking at the disabled population, as well as population studies in which we were able to look at the aging process. And these have been supplemented by a number of other new studies, which have gone into the field, which either focus on specific populations or specific areas of disease. And your favorite study may not be in here, but I think that the main thing is to say that we have moved from an agenda which is limited to looking at the disabled to really studying the heterogeneity of the elderly population.

Now one question, since age alone obviously does not define what healthy aging is, is what does. So the first question, which seems a little simple, is this healthy aging defined by health. And I think that all of you from your own experience can answer no. That is if you think about health conditions, you all know people who have myocardia infractions. Some people afterwards can play tennis, and some people are confined to bed.

So the presence or absence of health conditions alone does not necessarily mean that you are healthy or unhealthy. But instead, we can look at disease and health conditions in terms of their functional consequences in terms of health. And this is a paradigm that I copied from the Lancet in 1987. And it actually talks primarily about chronic illnesses in children, but I think that it is well applicable to any age.

That is diseases are characterized not only by their biologic severity, but by their physiologic severity, their functional severity, and the burden that they create for the individual and for society. And in aging, it is really this issue of functional independence, which has been used to define health and aging.

Now what do we mean by functional independence. There are a number of scales. And if you work in the aging field, I am sure that you are familiar with these. There is the Activities of Daily Living Scale, which is one of the first

that came into wide use, that looked at activities that are necessary to do in order to maintain yourself in very, very basic functions of daily life. The Philadelphia Geriatrics Scale augmented that in terms of activities that are necessary outside of the house, such as using money, using the telephone, and doing shopping.

And then there is also a scale, the NASCHE scale, which was used initially to look at disability for workers, but it has also been applied to the older population. And these are some data from the longitudinal study on aging, in which we looked at physical ability in individuals aged 80 or older.

And we looked at items such as lifting ten pounds, the ability to walk up ten steps without resting, walking a quarter of a mile, stooping, crouching, or kneeling. And we found that even at age 80 or older, that those individuals responding to this national survey, that 43 percent of the men and 28 percent of the women said that they were able to do all four of those things without any difficulty. So one way of looking at functional status is in terms of physical function and self-reported function.

Another way that is coming to use in recent times is to actually look at performance measures, because we know that sometimes people do not necessarily report for a variety of reasons their true level of functioning. So we have started asking people to show us how they do certain very simple

measures, for instance rising out of an armless chair, or walking 10 to 20 feet, and timing them as they do these maneuvers. And that every study has shown a distribution of these measures in the population. And those individuals who are slower are actually at a higher risk of morbidity and mortality. And Dr. Jacoromic and his colleagues have really been in the forefront of development of these measures.

However, we also realize now that there are a number of other very important dimensions to functional status. And that would include not only physiologic reserve, the cognitive research, the emotional status, and psychological factors.

Now I put this slide in here. It is a picture of a family having their picture taken, a multi-generational picture. And they are outside their house. And the man leans over to his wife who says, "Some relationship, huh, kid?"

Now I put this in here for two reasons. First, to discuss the issue of emotional health and emotional support, and a maintaining of independence in healthy aging. But also to make the point that we have healthy agers for a number of years. And they are usually those individuals who have managed to have better resources in terms of economic resources. So that actually the increase in the economic status in the United States that is being touted now in terms of poverty for children, and poverty in mid-life, and crime statistics also has a trickle down effect in terms of the elderly. Because we

can expect that future generations, who have actually experienced a better economic status as they grow older, that in fact that will raise their level of healthy aging as well.

Now when we look at emotional functional health, there have recently been a published series of articles on what is being called emotional vitality. And I think that this is a very interesting concept. This is a paper by Dr. Brenda Penix and her colleagues. And what she has done is she has taken some measures -- depressive symptomatology, personal mastery, and happiness -- and we looked at whether or not those relationships, how correlated they are with health. And whether we can define this dimension as another aspect of healthy aging.

So in fact, what she has done here is look at cross-groups of disabled individuals. So if you look at three and four on the bottom, four are the most disabled individuals and two are the least. And then she has divided people also in terms of adequate and inadequate emotional support. Because that also obviously is an important aspect of emotional vitality in old age.

But even so, what she found is that those individuals who were specifically very disabled that has four disability domains, that those women, and this data is taken from the women's health and aging study, have an increased risk of emotional vitality, if they have adequate emotional support and

score well on these tests. So as a result, you can see that physical disability does not necessarily correlate with emotional vitality. And even those very disabled individuals can still have a quality of like which is quite good, and which speaks to the question of healthy aging, even in the face of physical frailty.

Now new research areas in the area of healthy aging has really started to look at even earlier stages of disability, so that we can define a better preventive agenda. And this is work by Dr. Linda Fried, who has provided seminal thinking in this area.

And what I would like to point out on this particular slide is the first line of data, which is called task modification, but no difficulty in tasks. So Dr. Fried, who has taken many of the things that we usually ask older people, for instance the ability to walk across the room, and she does not just ask whether people can talk across the room, but she says have you changed the way that you walk across the room, or do you walk across the room less often.

And then she takes that data and uses it to try to get a profile of those individuals who are still capable, but who have in fact have altered the way that they have had to function in every day life in order to compensate for deficits. So she defines a group of individuals who are at risk, because they have in fact changed the way that they do things, so they

can continue to function independently, but who have had to alter that because of underlying health or physical problems.

And what she shows here is that even controlling for walking speed and stair climbing speed, and even controlling for a number of diseases, and strength, and balance, that in fact having changed the way that you do something in order to compensate for a particular underlying problem is associated with increased risk of disability in the future.

And I think that this is a very exciting area, because it gives us another way of talking to older people about how they are changing, and to try to identify who we can work with in terms of promoting health and aging before the deficits become very severe.

This is also focused on the question of healthy aging in the area of physiologic reserves. I think that we now recognize that no matter what physiologic system that we look at, whether it is the brain, the heart, the muscle, that really what we are trying to do is we are trying to increase the area of reserve that people can tap into when they do have to modify the way that they function in everyday life.

What this shows is that at age 30 that in terms of the absolute aerobic requirements for being able to carry out activities of daily living, at age 30 it takes 31 percent of the aerobic energy that a man can generate, and about 42 percent for a woman. But that increases at age 50. You have

to use up that much more of your functional reserve without 5 percent more of your functional reserve if you are a man and about 6 percent more of your functional reserve if you are a woman.

And we do not have a slide here for age 80. But you can imagine that at age 80 that people in everyday life are functioning much more at the top of their functional reserve. That is so you have much less capacity to compensate if something should happen, and you should have to dig further into your reserve.

This period of time, the last 15 years, have also seen a revolution in terms of helping preventions. And some of the speakers later will be discussing these in more detail. But the important aspect here is these are data from the Fast study, which was an intervention for osteoarthritis. And what it shows is that relative to those individuals who have health education alone, that those individuals who have exercise or resistance exercise as an intervention for osteoarthritis did much better.

We have seen major advances in terms of interventions for osteoporosis, for heart disease, for hypertension, and for osteoarthritis. And I think that the coming years will see many, many further interventions, which even in old age have the possibility of increasing the prevalence of healthy aging.

Now what I would like to do in the remaining part of

my talk is just run briefly through a study that our group is doing on the dynamics of health, aging, and body composition. We felt when we started planning this study back in 1992 that there were many questions, for instance about ideal body weight and about muscle mass, that would allow us to address them in a study like this.

So we are interested in identifying how changing body composition in old age acts as a common pathway by which disease affects morbidity, disability, and mortality. This is a seven year longitudinal study, a cohort study, of 3075 men and women who are age 70 to 79. And I will talk a little bit about our choice of age group. There is 42 percent of the cohort is African American. That is about 46 percent of the women and about 33 percent of the men. The cohort was recruited in Memphis, Tennessee in Pittsburgh, Pennsylvania. And we selected people at baseline to be able to walk a quarter of a mile without difficulty, and to be able to walk up ten steps without difficulty.

What we were trying to do is to look at the roller-coaster that older people follow as they move from health and independence to disability. And we wanted to try to capture those events based on a model from the AIDS literature that were recurring in the period of time in which no one was really much attention, this period of time in which there are events here suggested to be hip fracture or episodes of pneumonia, in

which there is a dipping down into those reserve capacities of emotion, cognition, and physical functioning, and then perhaps an incomplete recovery for those individuals, which helps to set them up them for the next level of deterioration through another event. And gradually, to have a decline to the level of disability.

So these are some of the data from our cohort. And I have tried to divide things by race to show the increased vulnerability of African American elderly in our sample. And you have to remember that everyone is aged 70 to 79. We selected people, so that they were all at the same level of functional health. And we expected that the cohorts would be relatively similar. We expected that the African Americans might have a little bit of an increased risk. But because they were selected to be at the same level functionally, that we expected them to be relatively comparable. We actually expected there to be no differences between men and women.

If we look at education, we see that older individuals have higher levels of education than we have seen in the past. But that the African Americans in our cohort actually have fewer years of formal education. If we look at family income and we look at those individuals with incomes of less than 25,000, our African Americans have much higher proportions who have low family income. And if we look at other assets, and this principally includes pensions, stock

funds, et cetera, et cetera.

We did not ask people to enumerate the exact dollar amount but just to tell us that they have assets, but again our African Americans have fewer assets. All of these put them economically at increased risk of not being able to continue to achieve healthy aging.

If we look at our functional measures of health risks, that if everyone started off being able to tell us that they could walk a quarter of a mile and walk up steps without resting, but in fact we still see deficits in the population. For instance, if we ask people to perform certain simple measures of performance, you can see the numbers up at the top. For the 939 white men, the performance score was 2.42 on average. And the score of the black men was significantly lower. In the white women, 2.18, suggesting that even on these tests of objective performance, that women performed less well than men, but the black women significantly lower than the white women.

If we look at the proportion who are able to do our challenge walk, which is a 400 meter walk in our clinic, and we just look at the simple proportion of individuals who completed the walk, it is lower in the African Americans than it is for the Caucasians. And again, the black men and the white women are relatively comparable, suggesting again a vulnerability in the population that exists even before people reach the level

of functional limitation or disability. We see similar results in the area of cognition.

Now I am not going to go through these in great detail, but we have a number of different areas in the study that are relevant in terms of body composition and nutrition. One area is our body composition measures. Older healthy agers are not necessarily thin agers. So if we look at the proportion of individuals who for instance have a body mass index of less than 25, it is about 30 percent or less for the white and the black men, and about 40 percent for the white women, and much lower for the African American women. Our mean for the African American women was about 30, which is about what it is for age comparable individuals in the National Health and Nutrition Examination Survey III.

What we had decided to do and to investigate. You have heard a lot in the nutrition community about the importance of visceral fat. And in order to settle these questions once and for all, and to help us understand also what is a healthy weight, we decided to do two measures of body composition. One is dual energy x-ray absorpitrometry, which gives us not only the bone mineral content, but also the total fat and muscle. And also x-rays, which allow us to look at the abdominal fat divided into subcutaneous fat, which is in the light pink; and visceral fat in the fuchsia; and also to look at size muscle and size fat.

Now this is our first set of data, looking at patterns of subcutaneous and visceral fat by sex and by race. I guess that we cannot dim the spotlight on this. But the first two lines, which are in blue and green, show patterns of subcutaneous fat in women. And each level of body mass index, the six different groups here, you can see that the levels of subcutaneous fat are very similar in the African American and the Caucasian women.

And the same thing is true for men. The next two lines there are the fuschia in the red. And those are for the white and the black men, the subcutaneous fat, and are very similar. But when we come down to visceral fat, despite the fact that the African Americans in our sample have more diabetes and more hypertension, and more of the factors that you would expect to be associated with visceral fat, at every level of body mass index, the African American men and women have significantly less visceral fat than the Caucasian men and women.

And we are trying to understand this in terms of their worst metabolic profile, and we are trying to look at other sources of fat in the body. And one of those sources that we are looking at is actually inter-muscular fat. Now as people get older, not only do they lose muscle mass, but they gain fat. And Dr. Goodpaster will be talking about this a little bit more later on.

These are three slides from individuals in the Health ABC study, which all have the same circumference but very different characteristics in terms of muscle and fat. And if you look at your extreme left-hand side, what you see is an individual, where the bright area is the bone, and the pale gray area is the muscle mass.

And you can see that this individual has a lot of muscle and very little subcutaneous fat, the little rim around there, and very little inter-muscular fat, which is the bright maroon. Where the individual on the far right-hand side has much less muscle, and much more subcutaneous fat, and much more inter-muscular fat. And this inter-muscular fat, at least at first glance, seems to share many of the characteristics of visceral fat, and maybe another metabolic factor that might turn out to be quite important in old age.

We have a number of other measures in the health, aging, and body composition study, which I am not going to spend time talking about. I would like to say though that we are very interested in corroborating. We have developed a population of older African Americans, because we do think that there are some special risks, and we are interested in looking at health disparities and relationships to nutrition and body composition.

I urge you to get in touch with us. If you have ideas or issues you think might be worth pursuing, this is my e-mail

address, and I will be around for most of the rest of the morning. So please come up to me and let me know. If you are interested, give me your card, and I can be in touch with you.

Now what I have tried to do this morning, just in conclusion, is to give you a view of what healthy aging is. That we tend to think of older people as slowing down and things gradually solidifying as people get older. But in fact, older people are entering the dynamic period of their life, and things are changing very, very rapidly. And I think that we have to be aware of that, and we have to think about that in terms of how we can characterize healthy aging. This is something that we are thinking about for the health, aging, and body composition study. And I think that it is something that we all realize if we work with older individuals.

So in some ways, healthy aging can really be characterized as the ability of the individual to be resilient, to be adaptive, to be flexible, and to mobilize compensatory areas as they face adversities in all areas associated with health, disease, and decline in old age.

And really what we are trying to do is to develop over time aging prevention paradigms. So whatever the level of health or healthy aging that individuals achieve, that we have preventive interventions available to them. So that among the healthy that we can prevent disease. And among those at risk that we can stabilize disease and prevent disability. And

among the frail, we can prevent the progression of disability.

I hope you keep this in mind as you go through the day, and I wish you a good symposium today. Thank you.

(Applause.)

MR. ANAND: Thank you, Dr. Harris.

Achieving 100 Candles: The Georgia Centenarian Study lights the way. It will be presented by Dr. Mary Ann Johnson. Dr. Johnson is a professor of foods and nutrition, and is on the faculty of gerontology at the University of Georgia. Dr. Johnson's research interests are in human nutrition and aging with an emphasis on vitamins, minerals, and health. She has studied centenarians, who are people over 100 years and older, since 1989. She received her undergraduate degree in chemistry from the University of Northern Iowa, and her Ph.D in nutritional sciences from the University of Wisconsin. Dr. Mary Ann Johnson.

(Applause.)

MS. JOHNSON: Thank you. I am very pleased to be here today to share information about centenarians from Georgia and from around the world. I would like to acknowledge my colleague, Dr. Leonard Kuhn, who is director of the Georgia Centenarian Study. And my other colleague, Dr. Peter Martin, who along with myself is a co-PI of the study.

Worldwide, the number of people aged 80 and older will increase from about 70 million today to 370 million in

2050. Estimates of the number of centenarians, those people aged 100 years and older, vary widely. Currently, there are at least a few hundred thousand centenarians worldwide, and this number will increase to more than two million by the year 2050 according to the United Nations. Other more optimistic demographers put this number much, much higher.

The United Nations estimates that in 2050 that most centenarians will live in China followed by the U.S., Japan and India. Centenarians in the U.S. in 2050 will number somewhere between about 300,000 and 500,000. And you can see from this slide that everybody in the business of estimating the number of centenarians does come up with a different number.

Why is the number of centenarians increasing so dramatically. There has been a twenty-fold increase in the number of centenarians in the last 50 years in some developed countries. June and Anderson-Rainberg from Denmark proposed several reasons, which in some ways seem obvious, that if you think of the diet and disease relationship, the rising tide so to speak raises that issue.

One of the most interesting reasons is that the restoration of sensory function through the use of cataract operations or the use of hearing aids leads to increased physical and mental health, increased activity, and therefore increased independence.

They also propose that the appearance and mortality

of several diseases have been postponed. There was more and better treatment for potentially fatal diseases, and has reduced mortality after major operations among the elderly. However, it is very interesting to me that they avoid stating that diet plays a major role, even though we know that nutrition is a major factor modulating the incidence, morbidity, and mortality from a variety of diseases.

Some of the most famous centenarians in the United States include the Delaney sisters, Beth and Sadie. Their book, Having Our Say, is truly delightful. Their ethnic heritage is American Indian, African American, and Caucasian. They were born in the 1890s. Beth became the first black woman dentist in the United States. Sadie taught domestic science or what many of us know affectionately as home economics in Harlem. And she became the first black teacher in the New York City system to teach domestic science in high school. They both had remarkable tenacity, strength, endurance, and faith in God.

Jeune Marie Camont was one of the oldest women in the world. She was born in France in about 1875, and died in 1997 at the age of 122. She was married in 1896 and retired in the late 1940s. Imagine a child born today, perhaps your own child or perhaps your grandchild, living until the year 2122.

Jeune Marie was found living in a nursing home, and she was thought to be demented. But actually, she was found to

just be very hard of hearing. Otherwise, she was in wonderful shape. And she was a women of incredible wit and humor.

The Queen Mum is one of the new centenarians in the world. And although she leads a life of wealth and privilege, many ordinary people become centenarians as we will see in just a minute.

Centenarians are being conducted in many countries, including Japan, China, the United States, Hungary, Germany, France, the U.K., Italy, Sweden, and Denmark. Many studies of centenarians focus on demography including verifying centenarians' ages, documenting the authenticity of centenarians from the past, and forecasting the number of centenarians in the future.

Psychological and medical aspects of centenarians have been explored. And there has been considerable interest in identifying longevity genes. And to date, there is some evidence that the APOE genotype, the E-4, is less prevalent in centenarians. But surprisingly, compared to younger elders, centenarians tend to have similar frequencies of many of what we call the disease gene. Little serious attention has been paid to the role of nutrition and dietary patterns in longevity, or in the role that nutrition might play once someone reaches 100 years of age.

There is some debate about the importance of nutrition for centenarians. The Japanese, who have one of the

longest live expectancies in the world, have studied centenarians for several decades. And they state that nutrition is one of the principal environmental factors for longevity. In contrast, Perl and his colleagues from the New England Centenarian Study state that studying self-reported diet would not prove fruitful.

Well, how did these two research teams arrive at such different conclusions regarding diet. There are differences in opinion regarding the importance of nutrition for centenarians that stems from what I call the "getting there" versus the "staying there" dichotomy. Getting there probably does involve dietary factors. But increased life span, decreased incidence, and severity of diseases therefore increase the chance of reaching 100.

However, identifying these dietary longevity factors is fraught with some major problems. First of all, there are no life long studies of the dietary patterns of centenarians. You can imagine that with the life span of 100, not too many researchers can hang in there that long to follow cohort studies of people for that many years.

Secondly, given the high prevalence of memory impairment among centenarians, it is not really possible to use self-reported dietary histories and population based studies of centenarians. Sure, we can get information about past diet from a centenarian that is very cognitively intact. But, of

course, we cannot do that very easily for those who suffer from memory impairment.

The "staying there" end of the equation involves identifying factors that promote optimal health in centenarians once a centenarian becomes a centenarian. The relatively what I would think is futile focus on dietary longevity factors has led us to overlook the possibility that nutrition could play a major role in enhancing the quality of life of these very long lived people.

The goal of the Georgia Centenarian Study is to identify predictors of life satisfaction and physical and mental health. We have studied about 90 elders in their 60s, 90 in their 80s, and about 150 centenarians. We are the only study in the world studying blacks. And our study differs from many others in that we are focusing only on centenarians who are community dwelling and cognitively intact, which is only about 25 to 30 percent of centenarians. And we are one of the few studies who attempts to use a control group. We use elders who are in their 60s and 80s.

We hypothesized that health and nutritional status of centenarians might follow several patterns. First, centenarians might have a unique pattern that contributes to their longevity. Another pattern would be health and nutritional factors that are maintained even at extraordinary ages. And a third pattern would be a specific health and

nutrition deficit. And the fourth pattern would be health and nutrition indicators that clearly deteriorate in a step-wise manner after age 60.

You might want to think for a minute what health and nutrition indicators that you would assign to each of these patterns, the unique pattern maintained, the deficits, or those that deteriorate.

Studies throughout the world including ours indicate that centenarians' blood pressure to be more like a 60 year old than an 80 old. And the centenarians do not smoke, and obesity is very rare. In Georgia, we find that centenarians tend to consume more carotenoids from fruits and vegetables than the younger elders.

Secondly, in our sample of community dwelling elders, the number of self-reported illnesses and medications, the use of health services, and alcohol is quite similar to those in their 60s and 80s. However, studies that include the total population of centenarians clearly show that centenarians do have more illnesses and health problems than younger elders.

In Georgia and throughout the world, it is well documented that centenarians have many deficits and activities of daily living, problems with mobility, depression, and poor cognition. Centenarians who remain in the community appear to rely far more on social services than on medical services. This finding underscores the key importance of social support

for centenarians. We find that vision and hearing deteriorate markedly. And also many centenarians can be classified as underweight, and there also appears to be a high prevalence of malnutrition.

Well, just when I told that centenarians have many problems with activities and mobility, here is a centenarian swimming laps in the pool. And although the use of tobacco is rare in centenarians, here is George Burns and his famous cigar. Obesity is rare in centenarians, but here is a robust Georgia centenarian who has lived in her home and took care of her own home. We followed her for many years. And during our last visit, we barely recognized her because of her marked weight loss.

Blindness is common in centenarians. And this woman in our study amused herself by playing her harmonica at all times of the day and night, much to the distress of her family. This Georgia woman enjoyed crocheting, which she took up again avidly in her 1990s when her pastor encouraged her to go ahead and have that cataract surgery.

Well, in the dietary domain, we found that compared to elders in their 60s and 80s, that Georgia centenarians are less likely to consume carbonated beverages, salads, salad dressing, fish, or yogurt. But are more likely to drink coffee, consume sweet potatoes, green vegetables, red meat, and whole milk.

Now before we jump to the conclusion that these are longevity foods, it is important to consider that these dietary patterns are cohort and cultural patterns rather than a longevity factor. In Georgia and other parts of the southeastern United States, foods such as sweet potatoes and greens are part of the southern dietary pattern. And these centenarians are simply enjoying eating the foods that they have had all of their lives.

In fact, as a yankee from Iowa, when I tried to explore this a little more with my colleagues, I was told in quite emphatic terms that, "Don't you know why we eat sweet potatoes and greens? Because that was the only thing left after Sherman went through here and burned everything." I said, "Okay, I see now."

(Laughter.)

MS. JOHNSON: Now the longevity foods of 2050 might reflect our dietary patterns of today. What could that be? Soy, salsa, strawberries, pizza, wholewheat bread, cappucino, and green tea. It is very hard to say.

This is Mr. Jesse Champion, a Georgia centenarian, an avid gardener. And here he is out in his little plot. He is slow moving, and the garden is a bit weedy, but he enjoys himself there. I think that the secret to his longevity may have been his spry 80 year old wife.

One of the most beloved centenarians in Georgia was

Mrs. Elliott. She outlived two husbands, one of her children, and was made rather famous by Hugh Downs, who interviewed her in her home. When the College of Agriculture found out in Georgia that centenarians drink milk and whole milk at that, they thought that they should pay her a visit. The agriculture school journalist who accompanied me had the foresight to buy whole milk from the creamery. Much to her delight, Mrs. Elliott said, "Oh, I love whole milk. I cannot get anything about here except skim milk since my 80 year old son had that heart attack."

(Laughter.)

MS. JOHNSON: Now in the background, you can see Mrs. Elliott in her youth. She was truly a beautiful woman inside and out. She lived to be 105, and was invited to the 100th anniversary of her kindergarten class. Although she could not attend, she delighted in telling us that she started kindergarten at the age of four ahead of her time even in her childhood.

Mrs. Elliott was also a gifted speaker. And we hosted an international conference for centenarian researchers in Athens. And one of the dinners that we had was in my building. And she lived there, and we asked her to say a few words. So she stood up, and I thought she would just say, "Oh, thank you so much for inviting me. I have had a wonderful life." Well, she started talking, and she started with the

kindergarten story. And she kept talking, and she kept talking. And then I looked at my watch wondering how long is she going to talk.

And a few of my friends who were sitting close to her kept moving their chairs closer and closer. We were afraid that she was just going to keel right over. But she went through the kindergarten story, the husbands, and the children. And once I started timing her, I think she talked about 30 minutes on her feet.

Well, when I told my psychology friends, Dr. Kuhn and Dr. Martin, that I thought that vegetables might be important for centenarians, they were not too impressed. They were holding out for something like chocolate. They said well, see if vegetable intake was related to some functional outcome in centenarians.

And I did a quick search of the literature, and found Dr. Snowdon's study, in which he found that the elderly Catholic nuns with the best functional status, that is the best activities of daily living and the highest ability in self-care, had the highest levels of leukopene in their blood. Leukopene comes mainly from tomatoes, and it is believed to be a potent antioxidant. And it might protect body tissues from oxidative damage.

Similarly, we found that tomatoes were the primary food associated with higher functional status in centenarians.

Centenarians with the highest functional status had the highest tomato intake even when controlled for other factors such as illness, depression, and gastrointestinal problems.

We have also identified several factors associated with survival after the age of 100. Those who live the longest after reaching 100 years of age are female, and the gender advantage continues even at age 100. And those having greater social support, higher cognition, and higher antipyretic status. The longest lived centenarians tended to have higher triceps skin folds, higher body mass index, and higher waist to hip ratios. Now these centenarians were by no means obese. Rather these data show the importance of maintaining weight in centenarians.

I would like to highlight some of the interesting findings from the Japanese regarding longevity factors. They found that compared to the shorter lived people in Akita, that the longer lived people in Okinawa consumed more beans, more green vegetables, and more meat. These results are somewhat similar to ours, and indicate that diets rich in certain vegetables and with adequate protein may play a role in longevity.

The Japanese researchers have also found a high prevalence of malnutrition in centenarians. Body mass index, hemoglobin, and dietary intake for fat and proteins end to be low in centenarians. Moreover, being malnourished was

associated with low activities of daily living and with dementia. Although we do not know the causal pathway, that is if poor nutrition caused these health deficits, or if these health deficits caused the poor nutrition, it is clear that a significant number of centenarians are probably malnourished. As yet, no studies have been conducted to determine whether interventions to improve nutritional status in centenarians will enhance their quality of life and their function.

In summary, both environmental and genetic factors likely play a role in longevity, but more research is needed to partition these contributing factors in centenarians. Perhaps centenarians live to 100 in spite of their diet. Our studies show that diet clearly reflects cohort and culture. So identifying universal dietary factors associated with longevity will be difficult.

In fact, I have been told by the Swedish team quite emphatically that the Swedish centenarians do not like green vegetables. But nonetheless, it is interesting that carotenoid intakes were high in our centenarians in Georgia. It is known that carotenoids and/or carotenoid rich fruits and vegetables are associated with superior immune status, lower rates of cancer and heart disease, and better functional status. Thus, fruits and vegetables are logical candidates for longevity factors. However, malnutrition and under nutrition are prevalent in centenarians.

The centenarians and the very old, just like Dr. Harris told us, we must identify factors that impair as well as improve nutritional status. The influence of nutrition and function must be documented. And we must identify and use interventions that will improve and maintain nutrition and health status in centenarians. We must extend the attitude that it is never too late, even to those aged 100 and older.

Further nutrition research on centenarians must include prospective studies in order to identify dietary longevity factors. In Georgia, we are also planning studies on the relationship of nutrition with function with an emphasis on carotenoids, Vitamin B-12, and folate. I know that many of you here have a little pull at NIA, where our program project is pending now. So tell them to keep the nutrition in there. We are also conducting some cross-cultural studies to compare nutritional patterns across various countries in the world.

The centenarians in Georgia have a lot to say about their own health. One said, "At my age, I am just thankful that I am healthy, that my health is as good as it is, but I don't think it could be classified as good."

Another says, "The greatest challenge to my health is the loss of hearing and sight. Because otherwise, my health seems to be good and stable."

And lastly, another says, "At night, I have taken out of teeth. I have taken out my ears. I have taken out my eyes.

And you cannot take my hair away from me. Now I am ready to go to bed."

(Laughter.)

MS. JOHNSON: Thank you.

(Applause.)

MR. ANAND: Thank you, Dr. Johnson. As is quite evident, we have a very high quality of speakers. At this time, we are going to take a biological and social break for 15 minutes. So please come back. There is coffee, and all of the rest is listed on your program. So come back in 15 minutes.

(Whereupon, a brief recess was taken.)

MR. ANAND: Please have your seats, so we can start the program again. Next, we will hear from Dr. Nancy Wellman. She is going to talk about nutrition's impact on longer, healthy aging. Dr. Wellman is the director of the National Policy Resource Center on Nutrition and Aging, and professor of dietetic and nutrition at Florida International University. Dr. Wellman is the past president of the American Dietetic Association, ADA. During her tenure at ADA, the Nutrition Screening Initiative, of which she currently serves as National Chair, was launched.

Dr. Wellman's areas of nutrition expertise include aging, public policy, sports nutrition screening and marketing, as well as consumer education and food labeling. Dr. Wellman received her undergraduate degree in home economics education

from the State University College in Buffalo, a M.S. in nutrition from Columbia University, and a Ph.D in education from the University of Miami, Florida.

Please welcome Dr. Nancy Wellman.

(Applause.)

MS. WELLMAN: Thanks, Raj. I am going to be closer to the computer, because the cable is not long enough to get me over there. But I think that we will work out just fine.

It is a pleasure to be here. I really think that it is pretty exciting that the Department of Agriculture has devoted one of its symposia to the topic of aging. I think that it says to us that aging is here and now, and more and more agencies are recognizing it.

The National Policy and Resource Center on Nutrition and Aging has a vision of reducing malnutrition and food insecurity among older adults. To really keep them at home, which is where they want to be, and to keep them out of nursing homes and out of hospitals. To have their quality of life continue, and to promote their independence. And we feel that one of the important ways that we can do that is by mainstreaming food and nutrition services in home, community, extension, and long term care systems.

Healthy People 2010 has for the first time in its opening statement recognized that we are growing older as a nation. We are no longer a nation of the young. The numbers

of people over 65 are now exceeding the numbers of people under 14.

And those goals are really quite well tied into the aging phenomena that is happening here, to increase not only the years of life, to increase longevity, but to make sure that those last years of our lives are quality years. And in doing so, one has to think about the health disparities, because that plays a big role in the quality and years of healthy life.

You can go into Healthy People 2010 on the Internet, and find the page where it allows you to sort of the objectives by categories. And if you sort by elderly, you will come up with 67 specific objectives that say older adults in those objectives. Assistant Secretary Takamura said that there are 274 that relate to older adults. But the ones that pop up with the words actually aimed at older adults are about 67. Of those, the 67 seem to be pretty disease specific, and two-thirds of those are nutrition related.

The other ones, and there are many other ones, relate to topics that are very important in terms of aging successfully. And they relate to food safety, overweight, oral health, vision, hearing, and physical activity. But I think again that we are seeing a trend where nationally aging is coming of age.

When I talk about aging, I like to talk about two seasons of aging. I like to talk about the independence that

really is the American ideal. However, we have a dependence phase, which for some of us may be fairly short, but for others unfortunately a little longer. Certainly, the independence one is the boomer expectation, but there are some limitations that may come along and compromise the act of aging.

If you have driven down the Florida turnpike, you see all of the sign boards attracting you to all of our retirement communities. But we are not talking retirement anymore. That is an out word right now. We are not talking seniors, and we are not talking even about elderly. We are talking about active aging. We are talking mainly about using the term older adults.

When you compare the independence and the dependence, we have heard already and you will continue to hear that it is not age specific. But for many people, it tends to start more likely in the 80s. When we turn 80, maybe we start a little more of the differences. But today, we are talking also about the new old. And the new old today that we are seeing as a nation are those of us who reach our 90s. And certainly, many more of us, as Mary Ann Johnson talked about, will be reaching our 100s.

When you look about these two seasons of aging, and look at the role of nutrition, I think that there are a lot of roles of nutrition in both stages or seasons of aging. And health promotion in keeping us independent, and to treat or

help us maintain our situation. So we are talking primary prevention in the independence phase, and secondary or tertiary prevention later on.

So when we talk to people about aging, we want to talk about the good news about what diets can deliver to help us stay independent. And when we talk about the dependence phase, we talk about some of the helpful supporting roles. And, of course, our goal is to help all Americans prolong the independent phases of aging, and to accommodate when there needs to be accommodation.

You are hearing a lot today already, and you will continue to hear today, a lot about functionality. And when we talk about functionality, certainly how we function, our quality of life and our independence is tied to the number of chronic diseases that we may be accumulating. But I think that sometimes we miss out on the fact that those chronic diseases can carry a burden that diminishes our functionality or our ability to remain independent.

So I have listed the common illnesses or conditions that commonly are more frequently seen as we age. And then I have given you some ideas of the functional impacts of those diseases. I think that there is an underestimate of for example diabetes that limits one's mobility and limits one's quality of life because of amputation and vision problems, being hours on dialysis, et cetera, et cetera.

So you can see that for many of you that are very familiar with this. But connecting functionality with the existence of a chronic disease may be new, and these chronic diseases have nutrition components.

We have talked a little bit already about functionality in terms of activities of daily living, ADLs and IADLs. But if those terms of ADLs and IADLs are new to any of you in the audience, there are a number of them that are specifically very closely related to nutrition and being able to remain independent.

We often talk about people who are discharged quite early and quite quickly from hospitals, who are sent home. And they cannot get out of bed, let alone get to the kitchen, let alone to the grocery store. So they are at a considerable risk in terms of providing independently for themselves in terms of their meals and all of that.

Then if we could just start running through this. What I have pulled together is I am trying to integrate the healthy people objective, the 2010 objective, with some of the critical factors that compromise our dependence or our independence in making us a bit more dependent.

Healthy People 2010 has lots of objectives that focus on obesity, because we have such an obesity problem in this country. And again, I think that we are aware much more now that we have got to encourage not only a reduction in calories,

but an increase in physical activity.

It is pretty impressive though that the incidence of overweight in people above 60 is about 40 percent for both men and women. It drops off some for those over 70. We are not sure whether that is because of the mortality of people who are overweight, that they just do not live as long. And we need to look at that data more specifically.

But as we age, fewer of us exercise vigorously rarely. And again, we need to get that message out. I think that starting as young that we can and keep reminding people to exercise physically a lot.

Now I am going to go through a number of conditions or problems that relate to functionality, and try to help you connect the food items, the nutrients and the food items that seem to be related to this.

With eye problems, age related macular degeneration, we have three key nutrients that seem to be involved. And we have lots of food that are wonderful sources of Vitamin E, C, and some carotenoids, and lutein particularly. There is some new data coming out that perhaps lutein perhaps plays a special role in age related macular degeneration. And certainly, there are lots of things that we need to know more about with the carotenoids.

But vision is something that we are all very concerned about, maintaining our vision. And I do not think

that I will ever buy enough reading glasses myself. It is not necessarily macular degeneration. But for those of us who are lucky enough not to wear glasses for a long time, wearing glasses makes us more keenly aware of the changes in vision that affect our functionality.

In terms of hearing loss, Mary Ann Johnson and her group are looking and are finding some new information about B-12 and folate. And certainly, there are lots of good sources, food sources, of B-12 and folate that may be related to slowing down our hearing loss. And age related hearing loss, of course, is the most common type of hearing loss.

In terms of cognition and mental health, Irv is going to talk quite a bit more about that. But we know that there are some connections between folate and B-6, and probably many other nutrients. But certainly, there are some rich food sources. And all of these lists of food sources are given in kind of descending order of intensity of that nutrient in there.

I will be happy to post these slides, this Power Point presentation, on our Web site. If you would like to get a copy of it, you could down load it from that. And we will give you that Web site in a little bit.

So I think that there are a lot of food, and functionality, and quality of life connections with infection and wound healing. Vitamins A, zinc, and C. Certainly, there

are lots of rich resources in regular foods that we should be eating frequently. And I think that we are very concerned about the decreased immune function as we age.

Falls, fractures, and mobility. I think that this is something that is feared the most among older adults, among us as we age. But we know that there are strong connections with the nutrients calcium, Vitamin D, and Vitamin K. And certainly, as a nation, we are trying to institute falls preventions programs, and help people reduce their risk of fractures, and keep again their quality of life and their functionality more impressively.

Certainly, you are familiar with a lot of the nutrient sources of calcium, Vitamin D, and Vitamin K. And we could not talk about falls and fractures without talking about osteoporosis. And we have the same foods that are listed on the previous slide. But certainly, osteoporosis is one of the nutrition related diseases that we are focusing on as a nation in Healthy People 2010.

Heart disease, the number one killer of Americans, has certainly some proven nutrition connections. Vitamin E, folate, fatty acids, fiber, and some other components in there. What people like is to find cocoa and chocolate on this slide, and get pretty positive about that. I think that the chocolate industry is pretty excited about the potential benefits of stearic fatty acids. So there are lots of things in foods that

we do not know yet what their benefits are. But certainly, you are getting the idea that we are promoting a food first approach in terms of active aging and healthy aging.

Diabetes, a big problem. It is our most costly chronic disease. One out of every $10 that is spent in health care is spent on diabetes. And one out of every $4 in Medicare is spent on diabetes also. The incidence is supposed to rise unfortunately to over 20 million by the year 2025. And we are already seeing a great increase because of our increased rate of obesity at all ages in Type I and Type II diabetes throughout the life cycle.

So certainly, there has been a lot of research on diabetes. And yet, there certainly are effective dietary treatments. And I think that what we are not always as cognizant of, for those of us who are not in the health professions, is that diabetes decreases functionality. That people with diabetes have two to three times more functional limitations. It is the leading cause of blindness and amputations. And the government has estimated that for every year that someone becomes blind that it costs the government over $13,000 a year in Social Security benefits, loss tax revenue, and productivity.

So it is a disease that is growing, and it is a very costly disease. And certainly, it is a disease that compromises our independence and our quality of life.

In terms of cancer, there are lots of nutrients, as there are lots of types of cancer. And we do not certainly understand the whole story. But encouraging people to eat a varied diet including lots of whole grains and lots of nutrient rich foods is certainly showing some promise, at least for some types of cancer. So again, there is a strong case to be made for variety in our diets, including all kinds of food sources.

Well, you have seen lots of foods, but how are we doing as a nation. We are not doing so well, especially as we age. The good news is that CSFII now includes two categories of older adults. And N. Haynes no longer excludes older adults either from their data. So we are going to be seeing lots more data on older adults, and that is certainly a trend.

Problems in terms of nutrient intake is that fiber intake is much lower than the recommended 25 to 30 grams per day. It is about half of that. Calories, we do not have a RDA. But we know that at least one in six, and we think this is a low estimate, of older adults take in less than 1000 calories a day. It is hard to get all of those good nutrients in when you are eating less than 1000 calories a day.

On the micro nutrient front, calcium and folate are our big issues. Calcium intakes are way lower than recommended. Folate fortification seems to be showing improvements already, only a year or two after folate fortification has started. But we have got some old intakes of

Vitamin E, magnesium, zinc, and copper in older adults.

In terms of the Food Guide Pyramid, we do not have one for older adults yet. Alice is going to talk about this later this afternoon. I think that the Tufts pyramid has really nudged the U.S. Department of Agriculture to think about one that is specific for older adults. I would probably not agree with floating that pyramid on as much water, because again we need to encourage people to not only hydrate, but to put some nutrients into those beverages. And I know that my time might be better spent encouraging people to drink calorie and nutrient rich beverages rather than just water.

I have a hard time convincing older adults to drink much in the evening, because of their arthritis and because of their osteoporosis, because they do not want to slip and fall when they have to get up and get to the bathroom late at night or in the middle of the night. So a gain, I think that we need a Food Guide Pyramid that specifically understands older adults, and focuses on nutrient dense and nutrient rich foods and fluids.

But it is pretty dramatic to see that among older adults, those 60 to 69 and over 70, that almost half are not even taking in one serving of dairy products. Almost half are not serving of dairy products. Fruits, about a third of older adults do not even take in or drink one serving of fruits or fruit juices. So that is a pretty serious deficiency there.

Because certainly, the dairy group and the fruit group have lots of those nutrients that we listed next to lot of those chronic diseases.

So we have got a ways to go, and we have got some important messages to get out to older Americans. And perhaps a Food Guide Pyramid that is designed specifically for them is certainly one of the ways to go.

But if you do not have enough money, you might have a hard time getting a good variety of food or getting enough food, and even getting enough calories. There are different statistics about what the extent of food security here is in the United States.

The Urban Institute in 1993 I think raised our awareness, and estimated that between 8 and 16 percent of older adults are food insecure. The USDA has just put out some new information. That based on their definitions, which may be a tighter definition, that about 6.3 percent of older adults who live at home alone are food insecure.

We know from the elderly nutrition program national evaluation that was conducted by Mathematica that at least 10 percent of people who come to congregate sites for meals are food insecure, and it rises to a dramatic 16 percent for those who receive home delivered meals.

Certainly, you are aware of what relates to the food insecurity, and they are listed there.

The Older Americans Act's elderly nutrition program, what we commonly call the Meals on Wheels, reaches only one-third of the needy older adults. It reaches only about 7 percent of older adults, and it has less than three million total participants. And the number and demand for home delivered meals is growing dramatically.

I would like to pose a parallel there. WIC and the Meals on Wheels program started the same year. WIC now serves 50 percent of eligible women, infants, and children. And we are at a single digit still with older adults in the meal program.

Income and poverty. We certainly see that particularly women are poor as they age. And as Assistant Secretary Takamura said, the older we get the poorer we get. The good news is we live longer. We get older, we women, but we are not necessarily very secure in terms of income. So I think that we can see that one out of six older adults are poor or near poor.

And when you look at income and health care expenditures, I think that is another important point in terms of food security. Because as we age, we do tend to need to spend more money on health care costs. And you can see that it costs almost $39,000 a year if you are in a long term care facility versus whether you receive care in the community. And how much of that do you as an older adult pay. It is between 9

and 16 percent of your total health care expenditures that come out of your own pocket. So that may be as much as $6000 or more dollars, a lot of which may be medications, but not all medications.

When we look at how serious the nutrition risk is in older adults, we took 30 studies that had been published with about 66,000 older adults, and found that two out of three were at nutritional risk. But because those studies included people who were both walking through malls to people who were on renal dialysis, we broke down where those people came from. And we found that the most at risk were people who were receiving home delivered meals and people who were outpatients of hospital facilities. About four out of five are nutritionally at risk.

There are some good data that shows the connections between that checklist score and your functional abilities. Both Jensen and Bowles have shown that functionality and even health care costs are related to your nutritional status.

There is also good data that says that if you put some money into nutrition therapy, that you will have some serious savings. There have been studies by the nutrition screening initiative, the American Dietetic Association and most recently the Institute of Medicine report, that showed that there were considerable savings from nutrition therapy.

There should be some reimbursement for nutrition services. We are talking about universal access for nutrition

services, because you should be able to get that access if you are living here in the United States. The Institute of Medicine suggested that Medicare cover nutrition services, and thought that the dieticians were the most logical people to provide those services.

You can see that in home health that is where the action should be. I tell our clinical dieticians in hospitals that their jobs are moving out of hospitals and into the home. However, almost two-thirds can afford no real home care. They get only informal or unpaid and usually family care themselves. That is despite our goals, our noble goals, of Healthy People 2010.

So I am saying that generally there is a shortage of nutrition expertise at all levels of the aging network, the long term care facilities, and home and security based care system.

I do not have a lot of time left, but I want to explain where I think that the problem is. We have two systems trying to help older people stay at home, which is where we want to age. We want to age at home. We have a supportive service system, and we have a medical and health service system. There are dieticians in both, and there are social workers in both, and there are nurses in both, but we are not talking to one another.

The dietician in the hospital does not know about the

Meals on Wheels program and the nutrition services in the community. We have two separate but parallel systems. We have got the individual floating between. But yet, that individual is really going in and out of all of these services. You no longer go into a nursing home necessarily to stay there. You go in and out of all of these services as you age. And we think that we should be linking those services better. That we should be having those two service systems talk to one another much more, and use some kind of care management if we are serious about keeping older adults at home.

I have two slides of my suggestions of what we want to do, as was reviewed in the GAO report that came out last month, to increase participation of older adults in federal nutrition assistance programs. Food stamps should increase the monthly benefit from the minimum of $10 to at least $25 for elderly households only. They should simplify the process. Once you qualify for, for example, Medicaid, you should become eligible for food stamps. I think that food stamps should become a vehicle to provide you meals, if you need them in your home or in a congregate site.

The commodity supplemental food program is only in less than half of the states and only a few tribes that provide the commodity supplemental food program. So that needs more funding. And the kinds of food that we distribute should take into account some of the needs of older adults, where the

variety of food should increase, and the packaging should take into account single households.

The Older Americans Act's elderly nutrition program, what we call Meals on Wheels, needs more federal funding. It has had stagnant funding. Again remember that WIC is at 50 percent of serving eligible people, and we are at 7 percent. There are waiting lists for almost half of the programs that deliver home delivered meals. And I think that USDA can do a little bit better by increasing the appropriation for the per meal reimbursement rate up from 54 cents that it is at today. Basically, what I think is missing is an infrastructure for older Americans' nutrition assistance program, particularly the Meals on Wheels.

If we are serious about good nutrition and its connection with long and healthy living, I think that we have to build that infrastructure for the home and community service system that is trying to keep older adults healthy, happy, and at home. There are a number of Web sites that you might want to jot down. And I thank you for your time.

(Applause.)

MR. ANAND: Thank you, Dr. Wellman.

Our next speaker is Dr. Bret Goodpaster, and he is going to speak on the muscles and bones and the impact of nutrition and exercise. Dr. Goodpaster is assistant professor in the department of health, physical and recreational

education, and an instructor in the department of medicine/endocrinology and metabolism at the University of Pittsburgh.

His recent research has focused on skeletal muscle attenuation and composition, magnetic resonance imaging in human body composition research, and the sarcopenia hypothesis involving muscle mass versus muscle strength.

Dr. Goodpaster received a B.S. from Perdue University, and a M.S. in exercise physiology from Kent State University, and a Ph.D in physiology from Ball State University.

Please welcome Dr. Goodpaster.

(Applause.)

MR. GOODPASTER: Thank you. And particular thanks to the organizers for inviting me to speak here today. I realize all of your hard work in putting together a symposium. And I definitely appreciate the opportunity to talk to you a little bit about an overview of exercise and nutrition, and particularly some of the work that we are doing in Pittsburgh regarding exercise and particularly muscle composition and muscle function in both aging, diabetes, and obesity research.

I will preface my talk by saying that I will not tell you everything you want to know about exercise and nutrition. Obviously, it is a huge topic. Some of our speakers this morning have done a very nice job in talking about the benefits

of healthy nutrition and aging. So I will not belabor that point. Neither will I belabor the point that we as a population are getting older. We have heard the statistics already this morning regarding the increasing age of our population.

I will say to I guess pose the question, and that is does physical activity prolong life span. And there are several data out now. This particular data come from Ralph Pathenberger and colleagues conducted on Harvard alumni. And they showed a clear association between increasing physical activity and calories performed per week, and the decease in age adjusted mortality rates.

So there is a clear effect on increasing activity on decreased mortality. And of note, it is interesting that even a modest increase in physical activity results in quite a significant decrease in mortality.

Now is an increase in physical activity alone the primary reason for longer lives. And we obviously know the answer to that, and it is no. Health care technology and treatment technology, et cetera, et cetera are obviously very important reasons for increased longevity as well as nutrition that has been highlighted already this morning. So an increase in physical activity alone is not the reason for longer lives. And in fact, one could probably make the argument that we as a population are decreasing in physical activity, increasing the

prevalence of obesity, et cetera, et cetera.

But what I want to focus more on today is to talk about aging with respect to not prolonging life span per settlement agreement, but aging and improving the quality of life. And we can talk about quality of life in terms of risks of falling, increased mobility, and increased independent living in our older adults.

And one of the primary determinants of quality of life is maintaining proper muscle function or healthy muscle function. And these data come from a classic study conducted in Scandinavia by Carlson and colleagues showing that across the life span after about age 40, that there is a sharp decrease in muscle strength with age. So after about 40 or 50 years of age, there is a decrease in muscle strength and overall muscle function.

Now what is the reason for this. One of the primary reasons that we lose muscle function and muscle strength with age is the loss of muscle mass. And this term sarcopenia, which I believe was first used in the literature by Dr. Rosenberg several years ago, was to indicate that we naturally lose muscle mass as we get older.

And if you look at a typical MRI scan of the mid-thigh region in a typical middle aged man and a typical 70 year old man, you can see that in about the same diameter of the leg that there are two striking features can be pointed out. One

is that there is an obvious loss of muscle mass in the older person. And the other thing to point out is that there is a striking increase in the amount of fat both around the muscle and infiltrated in the muscle. And I will be talking about this concept of fat replacement of muscle in a couple of slides.

So we do lose muscle mass as we get older. These data are taken from the Health ABC study that Dr. Harris was talking about earlier this morning. And you can see that even when we look at from age 70 to 80, that we see a steady decrease in the amount of muscle, even in our older cohorts.

So then we can pose the question can we actually prevent the loss of muscle strength and lack of muscle mass as we get older. And these data are taken from now classic studies that are conducted by Walter Frontera, and Bill Evans, and their colleagues at Tufts University about 15 years ago, in which they showed that when you put older people on a 12 week weight training program or resistance training program, that even these older people are clearly able to increase their muscle strength.

In fact, subsequent studies conducted by Dr. Evans and his colleagues in 90 year old nursing home residents showed that even these very old men and women can increase their muscle strength in fact proportionately just as much as a younger person. So they still have the capability to improve

muscle strength even well into their 90s.

Also shown in this study was that this increase in muscle strength was closely associated with an increase in the amount of muscle. That 12 weeks of weight training resulted in a significant increase not only in strength but an increase in the size of the muscle. So again, this loss of strength as we get older is closely associated with the loss of the amount of muscle.

So one of the things that we are really focused on now is not only looking at how we lose muscle mass as we get older, but what happens to the quality of muscle as we look older. You can see here that if you look at a typical x-ray of thigh muscle, you can see that the gray is indeed muscle, and white is bone. And you can see highlighted in red are these pockets of fat buried within the muscle, as well as fat outside the muscle.

And in Pittsburgh, we are starting to look, along with the Health ABC study with Dr. Harris, to look at what is the significance of this fatty infiltration of muscle, and how does that relate to decreased muscle quality as we get older. And we can see from these data that if you look at the density of muscle per say, which is a reflection of how much fat is contained within the muscle, you can see that as you decrease muscle density or increase the amount of fat contained within muscle, that the person is significantly weaker.

So the more fat that you have in the muscle, the weaker you are independent of the size of the muscle. So the quality of muscle is also an important issue that we need to consider when talking about the effects of physical activity and nutrition on maintaining overall healthy living in older adults.

And I will just briefly mention that also some of our research is focused on this muscle quality with respect to the prevalence of diabetes and obesity in some of our clinical research investigations. Working with Dr. David Kelly in Pittsburgh, we are looking to see whether or not this increased fat contained within muscle is a cause or consequence of obesity and obesity related Type II diabetes. And also looking to see what type of diet and exercise training interventions can we implement to improve muscle quality, improve muscle metabolism, increase the muscle's ability to burn fat as an energy source, and how does that relate to overall muscle function and muscle metabolism.

So we can then ask the question, of course, is nutrition important in preserving muscle. And just to briefly take you through this diagram. These are data primarily obtained Dr. Bill Evans and his colleagues when he was at Tufts. And let me just explain what the Y axis is. Is protein intake required for nitrogen balance. And you can just look at nitrogen balance as basically meaning protein balance. So if

you are a negative nitrogen balance, that means you are a negative protein balance. So if you do not consume adequate protein or nitrogen from protein in your diet, you will be in a negative protein balance. You will lose muscle. So it is optimal to be in nitrogen or protein balance or slightly positive protein balance.

And what this is showing you is .6 grams of protein per kilogram body weight per day is required to maintain protein balance in all adults. And I believe that the current RDA guidelines for protein intake for all adults is about .8 grams per kilogram body weight per day. I could be corrected by that, I am not sure.

The studies conducted by Dr. Evans and his colleagues suggested that the protein required to maintain nitrogen or protein balance in the elderly was slightly higher than that required to maintain protein balance in all adults, suggesting that the safe recommended protein intakes for older men and women was actually higher than the RDA for all adults.

So in order to maintain muscle mass in these older adults, it is important to consume adequate protein somewhere on the order of 1.0 to 1.25 grams per kilogram body weight per day in older subjects. And as we have seen already, maco-nutrient intake can be a problem in our older adults. So we need to focus on maintaining adequate safe protein intake for older adults in particular.

Just to highlight a couple of recent studies that have been conducted to look at the interaction of protein intake and exercise on protein metabolism. Because you have seen from the previous slide that if you do not get enough protein in your diet, you can be in negative protein balance, and your body will have to rely on muscle breakdown for protein balance, which is not necessarily a good thing, because it will increase the rate of loss of muscle mass.

These studies were conducted by Bob Wolfe and his colleagues in Galveston, Texas looking at protein metabolism both at rest and during exercise. And really, the take home message from this left graph is that when you exercise, protein metabolism is increased. The top graph is showing you the protein synthesis, and the bottom graph is showing you the protein breakdown.

So you can see that when you transition from rest to exercise, that there is both an increase in protein breakdown and protein synthesis. So the goal is to optimize again the balance of protein synthesis and protein breakdown.

The graph on the right shows a study that was conducted in elderly individuals showing that if you gave them amino acids compared to basal resting conditions, that these elderly individuals increased their protein synthesis by about double, indicating that protein intake was directly incorporated into protein synthesis, again to maintain muscle.

So the take home message from this is that it is important to maintain protein intake. And particularly when older individuals are engaged in activity, there can be a disproportionate amount of protein breakdown for the amount of protein synthesis, if there is not adequate protein intake.

So we can summarize this section about physical exercise on maintaining muscle, maintaining muscle function, and strength by saying that we know that muscle mass and strength decrease with age. And it seems to be just a natural progression or a natural consequence of aging. But we also know that older men and women can respond to resistance or strength training proportionately just the same as younger people.

And also, we have highlighted the importance to maintain not only muscle mass as we get older, but also to maintain muscle quality. And again, with the increasing prevalence of obesity, decreased muscle quality is associated with increased obesity. So it is not only important to look at muscle quality from an aging perspective, but also to look at muscle quality from an obesity and aging perspective. And lastly, it is important to maintain adequate protein intake to help maintain muscle mass.

Now this is not an extreme case of sarcopenia, but sort of my segue into talking a little bit about exercise and nutrition and osteoporosis. My expertise is more muscle

metabolism and muscle function. But I will say a few things about physical activity in the prevention and treatment of osteoporosis as we get older, and just a few basic facts that you are probably well aware of, but I will highlight anyway.

And that is in the U.S. each year, there are 1.5 million osteoporosis related fractures resulting in a related estimated health care cost of about $14 billion per year. And by the age of 60 to 70, only one in nine women will have normal bone mass. And after age 80, 70 percent of all women will have osteoporosis.

You cannot see it very well, but just to highlight that this disease of osteoporosis is not limited only to women, that two million men also have osteoporosis. In fact, one-third of all hip fractures occur in men. And one-third of all of these hip fractures will not survive the event. So highlighting the importance of not only osteoporosis and its affiliated health care costs in women, but also in men.

Also important is to note that for every 10 percent increase in the risk of fracture, osteoporosis related fracture, there is a one standard deviation decrease in bone mineral density. So just highlighting the important association of the loss of bone content to increased risk of fracture. And this data is about 20 years old now. But it is showing basically that as we increase in age that there is a steady decline in bone mineral content of bone density.

A study conducted about ten years ago showed that an increase in the amount of muscle strength, in this case lower back strength, was related to an increase in bone density. So that the stronger individuals had a higher bone mineral density, highlighting the importance of maintaining muscle strength and bone mineral density decreasing the risk of osteoporosis related fractures.

Another study conducted seven or eight years ago by Nelson and colleagues showed that compared to a control group, elderly individuals put on an exercise training program, and this was basically weight bearing exercise, resulted in a significant increase in bone mineral density, again compared to the control group in both the femur and the spine.

So what role does nutrition have in the prevention or treatment of osteoporosis. I probably do not need to say about this. We have heard from Dr. Wellman already about the importance of maintaining proper and adequate calcium and Vitamin D intake. This is just showing basically here that as you increase in consumption of milk presumably relating to an increase in calcium consumption, that there is a significant decrease in the incidence of osteoporosis fractures. And as well, an increased exposure to sunlight relating to increased Vitamin D exposure. It is also related to a decreased incidence of hip fracture in the elderly.

So we could summarize this section by saying that

bone mass decreases with age. And weight bearing exercise, walking, resistance training, et cetera can increase bone mass even in the elderly. And obviously, it is important to maintain adequate calcium and Vitamin D to maintain optimal bone health.

Thank you very much for your attention.

(Applause.)

MR. ANAND: Thank you, Dr. Goodpaster.

Our next speaker is Mary Fran Sowers. And she is going to speak on arthritis and emerging nutrition issues. Dr. Sowers wears many hats. She is a professor in the department of epidemiology at the University of Michigan school of public health. She is a professor in the department of obstetrics and gynecology, and professor in the department of internal medicine. Dr. Sowers' research is focused on the disease aspects of women's health including osteoporosis, osteoarthritis, obesity, as well as functional limitations and disability. She received her undergraduate degree in nutrition from Emporia State University, Kansas. She has a masters of science and nutrition from Oklahoma State University, and a doctorate in epidemiology and preventive medicine from the University of Iowa.

Please join me in welcoming Dr. Mary Fran Sowers.

(Applause.)

MS. SOWERS: Thank you very much. It is a pleasure

to be here today, and to join all of you in this activity. I am going to talk about nutrition and osteoarthritis and its public health implications. And I need to say right at the beginning that the pathogenetic mechanisms underlying OA, osteoarthritis, and its initiation are not fully understood. Likewise, those factors that are related to its progression, and it is a progressive condition, are ill-defined.

Nevertheless, individuals have frequently sought explanations for the development and the progression of osteoarthritis in their dietary practices and in nutritional deficiencies. And they have sought this either from their health care provider or in the absence of a response from that health care provider from other media sources.

Currently, there is an enticing array of activities and ideas out there which have more or less foundation. And there is much attention that has been directed towards this area, looking at things like anti-oxidant vitamins, looking at Vitamin D, looking at chondroid sulfate, and looking at glycocyamine. And let's look at which people are interested in this area, and what they are doing to address it.

First of all, let me define what I am talking about a little bit. Osteoarthritis is actually a failure of tissue in and around joints. And this manifests itself as a softening of those tissues, fibrillation, and you get ulceration of this material. There are osteophytes that are formed, which are

bony projections in spots where there are not supposed to be projections. There are bony cysts. And ultimately, there is a loss of the covering cartridge and exposure of the subchondral bone.

And we have listened to lots of definitions and lots of talk about statistics. But one of the things that I would like to point out to you is that we project that by age 70 that 80 percent of the population will have osteoarthritis in at least one joint in their body, and for many people in multiple joints.

Now what is this entity that we speak about. This is it. And what we have here is a typical knee where you have the bone, and you have the cartilage. And by the time that the osteoarthritis presents itself in terms of joint pain, tenderness, limitation in movement, and crepitus which is that crackling sound when you rub bone against bone -- yes, you can all stretch now -- the fusion which is the fluid into the joint space and a localized inflammation process, then you begin to see a joint that looks more like this.

Please notice that I am talking about this not just in terms of cartilage, but also in terms of bone. Osteoarthritis and its related groups are considered the leading cause of disability in persons 15 years of age and older. Please note that is greater than spine or back problems, heart disease, and so forth.

This places considerable social and economic impact in our society. Of those affected, it is estimated that approximately one in five will have a major issue with their ability to work. And ability to work is very much becoming an issue of aging. It is the leading cause of restricted days of activity and days in bed.

There are also significant economic concerns when you are talking about this. It is hard to believe that something like this is accounting for approximately 13 percent of all short stay hospitalizations for approximately 15 percent of physician visits. It is the second most frequent cause of the use of both prescription medication as well as over the counter medication. And it accounts for approximately a cost of one percent of the gross national product.

Now what are the classic risk factors that we recognize. They are identified on this slide. First of all, this tends to be a condition that is more frequently observed in women. And this is an interesting juxtaposition with respect to aging when you have more women who are more likely to survive to the older ages. And this is a condition that is more likely to affect them.

Women are more likely to have Heberden's nodes. And those are the little nodes that show up on your fingers. And you can all give you a physical exam right now, and see if you fit that category. Women are also more likely to have more

joints affected. It is a condition that is associated with greater body mass index. Typically, the levels begin to be expressed more frequently at a BMI in access of 30. There are also race and ethic disparities. For example, it is believed, although there is not excellent documentation of this, that African Americans are more likely to be affected. There is also a recognition that there is an element of joint injury that is associated with that.

There are other risk factors that are much, much, much less well documented, which are shown up here, including occupation and manual labor. And physical activity. Now I want to make this very clear. We are not talking about normal walking and this kind of thing. We are really talking about very intensive injuries. For example, those that may be occurring on the football field where people are hitting turf and doing quick turns, and this sort of thing. I must admit that I cringe a little bit when I watch some of the gymnastics in terms of the Olympics. I love it, so I watch it anyway.

Smoking is something that is quite controversial with respect to this. There is some suggestion that it may actually be protective. Whether that is because of its influence on body size or not is an unknown at this point.

There are suggestions that actually menopausal transition may be associated with an increased risk. Right now, there is a lot of interest in looking at the genetics of

this. There is definitely a relationship with bone mineral density. In that people who have higher bone mineral density are actually more likely to have osteoarthritis. And the nutrition area is extremely ambiguous.

I am going to try to talk about what is known about some of the nutrition areas. And as I do this, I have got to step back just a little bit and tell you about the tissues and the cells that are involved in this, so you understand the linkages. And so please note that osteoarthritis includes articular cartilage. That includes Type II collagen. It includes something called proteoglycans, Type IX and Type X collagen, and the importance of fluids. Because it is that matrix of those proteins that are holding the fluids in the cartilage. And this is providing the lubrication that is so essential in that joint.

It also includes the cell types that are associated with this, which are called chondrocytes. Bone is an essential component of this. And it means that is the Type I collagen of bone. And then the bone turn-over cells, and that is osteoclasts and osteoblasts. So if you are talking about a nutrition contribution, you have really got to consider it in relation to these elements.

Now we believe that there are at least four possible pathways whereby nutrition might be an important element of this. And these include those shown up here, that is

protection against excessive oxidative damage, modulation of the inflammatory process, cellular differentiation, and those biological activities that may be associated with bone.

Let me elaborate just a little bit. Because here what I am showing you are one of the proteoglycans, the long matrix types of materials. And it is well recognized that there is evidence within cells within the joint, that there are reactive oxygen species there. And that there can be excessive oxidative damage that is physiologically important in relationship to osteoarthritis.

Now we know that reactive oxygen species are produced under many circumstances. But it appears that this might be one of those circumstances in which the balance becomes tipped, and there might be an excessive reaction.

So when we have looked at the kinds of studies that have addressed this, we recognize that reactive oxygen species have been shown to cause the depolymerization of hieronic acid, one of the components of the matrix. There is degradation of the proteogylcans, and that Type II collagen that is important in cartilage.

There seems to be a great activation of the collagenase of the enzymes that are responsible for degradation. And an increase in the enzyme levels that are probably due in part at least to the reactive oxygen species. But right now, it is believed that this is really related more

to the progression than to the initiation.

There are other areas where this might be important. We recognize that there is an immuno-regulatory response that occurs. When you have liquid peroxidation, peroxidanic acid has its products such as prostalandius and leukotrienes that result in an inflammatory response. We know that this occurs with injury and with tissue damage. And we know that there is a certain cellular response and an acute inflammatory response that can arise. And this is part of the repair process.

Now one of the things that has been problematic in considering this with respect to osteoarthritis is that osteoarthritis has not really been considered an inflammatory condition. Rheumatoid arthritis, yes, but now osteoarthritis. And one of the thing that I would like to do is to show you some of the work that we have been doing with respect to this. Because there are now new more sensitive assays available to examine these inflammatory responses. And one of the measures for this that is a general acute phase protein is something called C-reactive protein.

And I hope that you can read this. But from our studies in women who are between the ages of 45 and 55, this is not very, very old ladies, that the prevalence of those with osteoarthritis is the C-reactive proteins which indicate an inflammatory response are approximately double those that have no osteoarthritis. And we are defining the presence or absence

based on what radiographs look like.

What is even more interesting and much more relevant for us, I think, is this line down here. Because this is looking at incidence. That is at one point in time when we took the x-rays, we could identify no radiographically defined osteoarthritis. And the next time we took them, lo and behold there was.

And at that baseline, you can again identify with something like this the C-reactive protein marker that we could predict those people who are more likely two years or three years from now to have this radiographic evidence. That gives us a wonderful opportunity to begin talking about preventive measures. It also gives us a wonderful opportunity to ask what are the nutritional components that are going to be important as a result of this, and I am going to flip ahead.

One of the things that we know that is an interesting characteristic of this is that obesity itself seems to have an inflammatory component to it. There is a body of work that is arriving now that suggests that there is an accompanying change in terms of the peroxide product that leads to a stimulation of these immunological responses, and actually generates an acute phase response.

Some people have suggested that mechanism is actually coming through insulin resistance. But osteoarthritis is an interesting condition. Because one of its highlights, one of

its characteristics, is this obesity. But we see the levels of C-reactive protein even higher even after we adjust for the contribution of obesity in these populations.

Now what is the literature out there and what is the work that has been done. Well, there is some, but not a ton of work out there. One of the areas that has been examined has been ascorbic acid or Vitamin C. We have demonstrations from the literature that said that Vitamin C is an electron donor to the type of collagen that is found in cartilage. We know that Vitamin C is an integral part of the glycoaminoglycans and the matrix types of materials, because it helps provide sulfate groups.

It has been suggested in more than one study that a deficiency in Vitamin C actually increases the matrix turn-over in osteoarthritis. And in surgically induced osteoarthritis among guinea pigs when they have provided them with high levels of Vitamin C, these animals after they have experienced surgery appears to have a less severe osteoarthritis than those who are not provided with the Vitamin C.

There has also been some suggestion of a positive impact using Vitamin E or A-Tocopherol. We recognize that typically A-Tocopherol prevents or at least contributes to the prevention of peroxidation of polyunsaturated fatty acids. It has also been suggested that Vitamin E may be beneficial to the body's immunological response.

What has been examined with respect to osteoarthritis is shown here. There has been a few studies, and this is exemplified here, that over time that Vitamin E levels might actually be beneficial. For example, one investigator described a reduction in the pain experience that is associated with osteoarthritis.

Now we have also looked at diet in our studies. And I have to tell you that this is a murky field, and it has not been easy to sort out. And these are the kinds of things that we see as we look at protective and maybe not protective dietary effects. We have examined beta-carotene, and we do not see an experience of having a reduced risk as estimated by an odds ratio that is statistically significant when you consider beta-carotene from dietary sources alone.

We do see a protective effect when we look at individuals who are taking supplemental beta-carotene in terms of hand osteoarthritis.

Interesting enough, when we look at our population, we do not see a strong effect related to Vitamin C, although it is marginally significant. We do see a protective effect with respect to hand osteoarthritis and Vitamin E supplementation. And we have measured diets and we have measured diets frequently in this population.

And I think that it is important to point out that the people in our studies, and this is a population based

study, that those who take supplements are more likely to have higher dietary intakes of these nutrients, too. So when you begin talking about seeing a supplement effect, you are really not totally sure that you are describing only a supplement intake.

Now I suggested that there were protective effects as evidenced by the odds ratio. The worm turns when we get to knee osteoarthritis. Because what we actually see with respect to these is that there is an increased risk of having osteoarthritis with supplementation of beta-carotene, with supplementation of Vitamin A, and with supplementation of Vitamin E.

And one of the things that we have observed, and this is the danger of doing cross-sectional studies, is that if you are just looking at this cross-sectionally, the people who have osteoarthritis are looking for something to ameliorate the pain. And the people on have hand osteoarthritis are not the same people that have knee osteoarthritis. So you may actually be describing two truths here, even though this looks contradictory.

There has also been some suggestion of the importance of Vitamin D. And that has been referred to a couple of times this morning. We recognize that there is relatively little known about the direct action of Vitamin D in terms of its metabolization that are being shown.

In the Framingham study, they have indicated that a relative deficit of dietary Vitamin D as well as the measured serum levels are associated with the progression of osteoarthritis. What they identified is that those with a low intake of Vitamin D were about three times more likely to exhibit progression of osteoarthritis than those that did not. They found no evidence for low dietary intake in terms of the development of osteoarthritis.

If you look at other studies that measure the serum markers, and there are three of them of which I am aware, the study of fractures, the Framingham study, and our studies in Michigan, Framingham has suggested that the lower serum Vitamin D levels are associated with progression. The study of fractures has suggested that lower serum concentrations are associated with joint space narrowing.

We showed no association in terms of our serum markers. And we have got to remember that in part that these are much older populations where you are dealing with progression. You are not dealing with emergent osteoarthritis.

One of the things that we would like to do is to suggest that there is a growing body of evidence that suggests for reasons that are yet unidentified the importance of chondroitin sulfate and glycocyamine. And it is really going to be up to the nutrition community and to the health care community to really evaluate the efficacy of these because,

since she is showing me a zero on my time, they are not regulated as drugs, and so there are questions about the purity. These are not prescription drugs, and many insurance companies are not covering them. They are expensive. And there are limited evaluations that actually suggest what the importance is of the guidelines and the use of these. And when income becomes a real issue, knowing the efficacy of these is really, really important.

So what I would like to summarize with is as follows. Osteoarthritis is a major component of the disabilities that we may see happening with people as they age. In terms of nutrition, there are lots of promise as to areas that might be important. For example, Vitamin D in bone, cartilage, the chondroitin sulfate, glycocyamine, the antioxidant, and the role of total calories energy balance and immuno regulation.

There is a lot of hype. And if you do not think so, look at the sales of the book called The Arthritis Book. There is lots of confusion. We get lots of phone calls, and it is certainly an issue worth pursuing. Thank you.

(Applause.)

MR. ANAND: Thank you, Dr. Sowers.

Our next speaker is Dr. Rosenberg, and he is going to talk about mental health and nutrition. Most of you probably know Dr. Rosenberg. He has been a frequent visitor to our symposia. Dr. Rosenberg is a professor of physiology,

medicine, and nutrition at Tufts University school of medicine and school of nutrition. And he is the director of the USDA Human Nutrition Research Center on Aging at the same place.

Dr. Rosenberg's primary research interest during the last two decades has been in the area of folate metabolism. And he has recently been exploring ways to better assess vitamin intake and status in older people. And the question of folate supplementation by women of childbearing age. Dr. Rosenberg received his undergraduate degree at the University of Wisconsin, and his M.D. at Harvard.

Please join me in welcoming Dr. Rosenberg.

(Applause.)

DR. ROSENBERG: Thank you, Dr. Anand.

I am very pleased to represent the Human Nutrition Research Center on Aging, which I emphasize is a USDA Human Nutrition Research Center on Aging at Tufts. It is one of the six centers that performs research on human nutrition, and the only one that focuses on nutrition and aging. I think that it was an expression of a great deal of vision and wisdom that this center was established roughly 20 years ago. And I think that it has allowed the USDA to exert true leadership in the nation and the world in research on this important relationship.

Now this is not a portrait of a young secretary, Dan Glickman. It is instead, I think that some of you will

recognize, a self-portrait of a young Rembrandt, with all of the excitement, and optimism, and brilliance of youth. A little later in his life, Rembrandt painted this self-portrait in his mid-years, a somewhat more somber Rembrandt. He had experienced some business reverses. But I think that you will agree that in terms of the quality of the painter doing this and the willingness to look seriously at his own persona, anything but a decline in his function as a great painter.

Not long before the end of his life, he painted this self-portrait. This is a sadder and perhaps wiser painter, who again was willing to look very clearly at the changes that occurred in his physiognomy, and also reflect on some of the heaviness which might be associated with age. But I think that again you will agree that there is no diminution in the brilliance of the painter.

And it is kind of an expression of what may happen with the passage of time, to some extent to mood, to some extent to changes in perhaps the appearance. But when it comes to wisdom and perhaps even the brilliance of the skill of the painter, anything but diminution with time.

Now this is certainly a way of introducing the topic of mental function with aging. I think that you are well aware that although we have heard in the last couple of presentations a very excellent presentation of the physical changes, the physical decline, and the physical function, the examples of

what may occur with aging. Probably that function that is most geared and most associated with senility, if you will, the term that is often used to describe cognitive function, is a change in cognitive function with age. And really even the caricatures of aging really are associated with that.

It is a matter of an enormously important concern. And it causes me to want to share with you a point of view about functional change with aging, which will focus in this case on changes in cognitive function. And what we can do by understanding some more about these changes and their relationship to our habits. But it will also I think generalize to other kinds of cognitive changes, and to show you that many of these changes have been matters of concern.

The person who is perhaps the father of modern gerontology in this country, Dr. Shock, who actually initiated the Baltimore longitudinal study on aging, did this cross-sectional study some years ago. He published this in the early 1970s to show that if you measure the effect of age on certain cognitive functions, if you look at the ages at the bottom, you will see that this is a cross-sectional study. And if you look at a very large series of cognitive function, there is a decline with aging.

Now there are a couple of things wrong with this observation, if it is to be used as a prediction of what really does happen with aging. One thing is that this is a cross-

sectional study. And the people in here who are 30, 40, and 50 are not the same people. It is not longitudinal. In fact, we have learned over the course of time that if you look at these same functions longitudinally, that the lines are much straighter and the decline is much less severe.

The other thing is that this represents the increasing heterogeneity of aging. That is to say that the people who are 50 are more heterogeneous than the people who are 40, and the people who are 60 are more heterogeneous, because there is an accumulation of degenerative diseases and so forth.

And in fact, it may be that we should be thinking more in terms, if we are talking about the nutritional modulation of degenerative disease, and I am including cognitive decline here as well, that we should be thinking of different patterns, of the white pattern of someone whose decline goes at a rather modest slope, or maybe even more parallel to the baseline, and it never reaches the position of disability. And the red curve, where the decline is faster and there is more accumulation of disease, and disability occurs as a somewhat earlier age. And the yellow one which is intermediate.

These are different populations. They have to be thought of differently. And we have heard of some of these described by previous speakers in terms of different kinds of

successful aging. But I also want to point out, as I did in the yellow curve there, that it is possible to change that trajectory. And just schematically here, if we intervene in the yellow curve, we may change that slope, so that decline in function does not occur at a rate that ever reaches the disability zone as shown there in pink.

That is a concept that I think is terribly important as we look at the degenerative processes with aging. And as we look at the hopefulness of identifying factors, nutrition, exercise, and so forth, that might influence those changes.

Now I am going to talk about cognitive decline in a rather narrow vision. I am going to talk about cognition as it relates to our information about only a segment of the nutritional spectrum, a few vitamins. But I think that I will use that as a case study to show how we might understand better the relationship between nutrition and the pathogenesis of degenerative conditions. And therein, at least have proposals which may help us to engage in preventive practices in the future.

This is by no means a comprehensive look at all of the possible relationships between nutrition and cognitive function, but it is one example. And I might even say in advance that it is an example which has yet to be proven in efficacy.

But this is data which plots of the homocysteine

levels in the blood of the last N. Haynes survey. And what you will see here, we did the homocysteine measurements. This is, as you know, a population based sample in the United States. And two things are shown here. First of all, the homocysteine levels increased with age both in males and females. And second, they are higher in men than in women at almost all ages.

And why do we care about homocysteine. Well, I would say that we care for two reasons. Number one, as I will show you in a moment, it is a marker for three important vitamins. That is to say that it stands at the crossroads of two important metabolic systems. One that requires Vitamin B-12 and folic acid, methylhydrofolate, to be specific for the remethylation of homocysteine, and peroxidal phosphate or Vitamin B-6 for the trans-ulceration of homocysteine.

In that sense, homocysteine is a very interesting mega marker, if you will, that identifies and coordinates several observations about nutritional status with respect to these three important vitamins, which I think many will agree are important risk vitamins in older individuals.

It also is, as you know, a marker for cardiovascular risk. And for purposes of this discussion, especially for cerebral vascular risk, core diseases of the cerebral vascular system. And in fact, in the early studies of homocysteine, the genetic studies, there was remarkably severe thrombo-occlusive

disease in infants suffering from homocysteinaria in their brain arteries and arterials.

Now the interesting thing is that homocysteine is not only at the point of interception of several pathways, as we just showed, but it is also related to levels of both folate and B-12 as shown here. You can see that the highest homocysteine levels are those with the lowest folate and the B-12. And the lowest homocysteine levels are those with the between folate status and the best B-12 status.

Vitamin B-6 can be put into a plot like this as well, again showing the real nutritional determinants, and we think that the determinants from the Framingham studies that we have done are at about 70 percent of homocysteine levels can be accounted for by knowing the nutritional status of those three vitamins.

Now what about homocysteine and central nervous system dysfunction. Well, I have said before that homocysteine is a marker of Vitamin B-12 and folate deficiency. And there is a suggestion that both B-12, certainly B-12, and to some extent folate, especially with regard to effective function or mood may have some direct effects on the central nervous system function.

But there is also the possibility that homocysteine is a direct neuro-toxin. Much evidence suggests that it is a vascular toxin. And this case, it would be a cerebral vascular

toxin. And there is also evidence that it contributes to a thromo-genetic tendency, and therefore might contribute to the thromo-occlusive disease.

Now there is a good bit of evidence that suggests that older individuals may be more susceptible to developing hyper homocysteine anemia because of some other physiologic changes that are occurring with age. This compares to Vitamin B-12 levels in young adults on the left, normal elderly subjects in the middle bar, and those with so-called atrophic gastritis on the right.

I think that you are aware that as we grow older that we lose to some extent the efficiency of our production of stomach acid due to probably inflammatory changes that are occurring in the subject. Stomach acid turns out to be very important for the intestinal absorption of Vitamin B-12. Because if Vitamin B-12 is going to associate with the intrinsic factor for later absorption, acid needs to get off its association with binding proteins in food.

Acid is also important in the absorption of folic acid. So we have a physiologic risk factor for things that may change vitamin status with age that could contribute to the tendency to develop high homocysteine levels. And then another connection, if you will, with a nutrition and vascular association.

Now it was John Lindenbaum at Columbia who made this

very important observation somewhat over ten years ago, showing that a number of people who had elevated homocysteine levels, and some of these had B-12 deficiency, but a lot of them had B-12 status in the normal range and folate status even in the normal range. And it has caused us to rethink what is the normal range for circulating B-12 and folate.

But when he treated these individuals with high homocysteine levels with Vitamin B-12, their homocysteine levels consistently fell. And most importantly, the large majority of these individuals underwent an improvement in their neurologic status in the face of this treatment. And many of them had an improvement in memory. Not all of them, but many of them did. And so we had now a functional observation relating to homocysteine levels to mental and neurologic function, and moved if you will by a nutritional intervention.

We have shown in the Framingham heart study that you can plot carotid narrowing versus homocysteine levels. And you can find that as plasma homocysteine levels go up, and this is true of both men and women, that the evidence for carotid narrowing goes up. And I think you well know that carotid narrowing predicts not only other vascular disease including coronary disease, but it certainly predicts the risk of cerebral vascular disease.

And subsequently, we have shown, as have a number of other studies, that increasing homocysteine levels is actually

responsible for increasing risk of stroke. And I think that the relationship between cerebral vascular disease and stroke and senile dementia is now increasing in its recognition. And we are realizing in the pathologic observations that we are doing even with Alzheimer's patients that the vascular component is getting more attention than it did before.

This is not to say that vascular change is the cause of Alzheimer's. What is says is that the cognitive decline, even of the kind that we have been calling Alzheimer's dementia, has probably a more important vascular component than has previously been appreciated.

Now at a rather milder level, if you study the population, and I think that Dr. Harris had referred to the population of the normative aging study, that these are veterans who are followed regularly for functional change and health change. In this population, we were able to show a relationship, by the colleagues at the Human Nutrition Research Center, showing that there was a relationship between plasma homocysteine, if you divided the population into four groups, and a declining success with certain cognitive function tests.

And in this particular test, which is a way of copying figures, you can see that the ones with the highest homocysteine had the lowest constructional practice score. This is well within the range, and these are functions above those seen in mild Alzheimer's disease. And it raises the

point again that there may be within the range of what we would consider normal cognitive function or even mild changes in cognitive decline, such that are quite common in older populations, that there may be modulating factors such as the homocysteine levels, in turn we think responsive at least potentially to differences in vitamin status.

Now speaking of those differences in vitamin status, one of the interesting things that has happened on the public health horizon in this country is the observation that there was a relationship between folate intake and supplementation and neuro-tube defects, which I think drove an interesting decision in the past few years to fortify flour with folate acid, and adding it to enriched flour.

And we have done some work now to look at what happens to folic acid status now in the population, and what has happened to homocysteine. And notice here that there has been a remarkable shift. Just the figure on the left. The dotted lines are the distribution of folic acid levels in the Framingham offspring cohort before. And the full line shows the shift to the right or the increase in plasma folate levels after folate fortification of flour.

To put it in a different way, the incidence of low folate levels under three nanograms pere mil went from 20 percent of that population to less than 2 percent of the population. It is a remarkable shift, greater than what we

thought would occur with the amounts of folate fortification.

But interestingly enough, we have also seen a rather substantial change in high homocysteine levels. And I think that the best way to look at this is look at the number in Exam 5 under pre-fortification, 17 percent or 21 percent of the population had high homocysteine levels above 13. And then in the post-fortification, and I think that the figure to look at is in Exam 6 which is after fortification, of 9.8, a halving and a decrease by 50 percent of the numbers of individuals with high levels.

And so again, a very interesting documentation of the fact that we can modify nutritional status, in this case by an intervention which uses fortification. Although I would certainly insist that this is not the only way that we can change nutritional status in the population. That emphasizing dietary change and even in some cases targeted supplementation will be useful.

But I think that we will now have the opportunity to see whether the epidemiologic information that indicates a lower risk of cerebral vascular disease and cognitive function associated with lower homocysteine levels will be able to be documented in some of these populations as we look at pre and post intervention. So although I think this is way too soon to say that we have performed an intervention which is going to have a major impact on cognitive function, it provides us with

a research approach that would help us to understand what might be the dimension of a nutritional impact on a terribly important aspect of not only aging, but of the nation's health. And so this is a very exciting and kind of optimistic opportunity.

I would just like to end with a couple of points. That we are now getting to the point, and it was observed earlier that one can look at APOE genetic poly-morphisms and begin to make some predictions about vascular disease. We can start to do some of the same things now in looking at the population sensitivity to folate intake as it has to do with poly-morphisms in certain genetically determined enzymes like methyltetrahydrofolate.

And there are examples of changes in the methyltetrahydrofolate gene. The major mutation has about a 12 percent frequency in French Canadians. In this study, it is about 15 percent in this country. And we think now that is a lot. In the hymozygotes, that is a lot of expression of a genetic difference.

And if this does in fact influence folate requirements and folate utilization, we are then starting to have tools that will allow us to even expect different kinds of outcomes with interventions in populations depending on the genetic sub-stratum that we are dealing with.

I wanted to show this just to end up, not only to say

it is time to go and have lunch, but to point out that another factor which appears to be quite positive and helpful in its association with cognitive function and mood in particular is physical exercise. And there is now an accumulating study data that indicates that people even in this age group who exercise regularly, and here is one of our subjects doing some of his weight resistance training exercise, undergo changes in mood and reversal of depression that are really quite impressive and certainly could be used and put up against Prozac and so forth in a very positive way.

And again, to make the point that there are things that we were likely to be able to do with diet and with physical activity that affect the mood, the sense of well-being, the sense of independence and purpose of older individuals that we might not have expected to do even a few years ago. We do not have to accept those sharply declining curves that were presented to us by Nathan Shock. I think that we can fight back, and that we can perhaps rectangularize those curves in a much more effect way, in a way that I think will be quite dramatic and important for the health of the population. Thank you.

(Applause.)

MR. ANAND: Thank you, Dr. Rosenberg.

If we could have the house lights, please. Now this is your chance to come and comment or ask any questions. There

are two microphones on both sides. I will ask that all of the speakers to please come here on the stage. Dr. Harris, Dr. Johnson, Dr. Wellman, Dr. Goodpaster, Dr. Sowers, and Dr. Rosenberg.

So please have your comments as brief as possible. And if you want to direct questions to a specific speaker, please do that. Or if you want to ask any general questions, go ahead and do it. There are two microphones, on both sides. You either have understood everything, or you were not awake. Yes, please. Please identify yourself.

MR. SHARKEY: My name is Joe Sharkey, and I am from the University of North Carolina Chapel Hill. And this is directed to Dr. Sowers.

And that is in your work with the A-Tocopherol, are you also looking at like the gamete A-Tocopherol like JoAnn Jordan and Lenore Arabar in their community based study in North Carolina on osteoarthritis?

MS. SOWERS: First of all, let me elaborate just a little bit there. There are probably two major osteoarthritis studies in the U.S. right now. One of them is in North Carolina, and the other one is in Michigan. The other osteoarthritis studies really have populations now who are almost too old to ask the questions of, which is an interesting statement making to especially this group. And both of us are looking at the full gamut of the kinds of nutritional factors

that we think are important.

They have tended to focus more on the anti-oxidants. We actually are very much interested in the immuno regulatory types of things, actually in terms of some of the thrombotic events, and have spread our interest a little wider.

MS. TALMIDGE: My name is Katherine Talmidge, and I am in the nutrition field in Washington, D.C. I was wondering if you could quantify a couple of things, but chances are that you may not be able to, or you will have said it.

But Dr. Rosenberg, how much Vitamin B-12 do you think that older people need in order to significantly affect their homocysteine levels? And how much protein do people need when they are strength training, Dr. Goodpaster?

DR. ROSENBERG: I will try on the Vitamin B-12 question. There looks as though, taking the Framingham as a population that may be representative, I do not know that anyone would argue that a suburb of Boston is representative of anything, but taking that population, it looks that by the age of 70 or so that about 40 percent of the population have a significant diminution in their acid production in the stomach and absorption of B-12. And their levels tend to be lower.

They will absorb B-12 from supplements, and they are not bound to protein. But they are not as good as absorbing B-12 from goods, where they have to use the acid to get them off of their protein binding. The supplement therefore does not

need to be terribly large, but it probably needs to be more than the two or three micrograms which is in usual supplements. And we are talking about people in that older age group that probably should be taking 10 to even 25 micrograms a day.

If they have, of course, pernicious anemia, losing their intrinsic factor, then the oral management would require 400 to 500 micrograms a day.

MR. GOODPASTER: I think that the question regarding protein intake with strength training in particular is a good one. The first thing to note is that even with aerobic exercise, total protein requirements increase. And that is basically because your total energy requirements increase. So if one keeps protein intake proportional to total increase in calories, then this 1.0 to 1.2 grams per kilogram of body weight per day should be sufficient.

It has been shown even in younger body builders that if they take in an excess of 1.5 grams of protein per kilogram body weight, that protein is not necessarily just converted to muscle, but rather it is converted to increased protein oxidation. In other words, sort of wasted protein, if you will. So I think that if one holds to this 1.0 to 1.2 grams per kilo body weight per day, it is adequate. Even with exercise, whether it be aerobic or strength training.

DR. ROSENBERG: I think that it should be pointed out also that those kinds of exercise drive an increased total food

intake to meet caloric needs, which will result in an increased protein intake. And therefore, I think that most of those people will meet their protein needs quite satisfactorily without pushing some of these supplements and so forth that may not even be needed or terribly healthy.

MS. WELLMAN: I think that we have a protein excessive intake as a nation on the whole. But yet, we have certainly a subsection of older adults, who are taking in way too little protein. Certainly, the long term care residents are at risk, depending on how many people are there to help the ones who need feeding assistance be fed. We have slow semi-starvation in lots of long term care facilities where it is a calorie, protein, and under-nutrition problem that is very, very severe.

That kind of problem is also what tends to drive people away from independent living into long term care. And it is often connected with depression, with tooth and mouth chewing problems, and with food preparation inability. We have a serious protein problem in segments of older adults, but it has some other characteristics.

MR. ANAND: Dr. Schenuem.

MS. SCHENUEM: Barbara Schenuem from USDA ARS. I have two questions, one for Dr. Rosenberg. I would like for you to comment on the likelihood of homocysteine being used as part of the physical exam, a medical examination.

And my second question is for DR. Goodpaster on the muscle loss with aging. It seems to me that there might be two assumptions. One is that the changes in lifestyle with aging lead to that kind of muscle loss, or loss of strength and loss of mass. But some of the way that you commented could also imply that as you age, that you actually have to be more active to retain the muscles you had at a longer age. And I would like for you to comment on those two different aspects.

MR. ANAND: Dr. Rosenberg.

DR. ROSENBERG: There is a lively discussion about whether homocysteine screening should become part of regular health screening, because of the many studies that have shown an association with cardiovascular risk. The conservative and I think probably even prudent position, which has been espoused for instance by the American Heart Association, is that unless and until homocysteine lowering has been proven to prevent morbidity or mortality from heart disease, that you do not have the appropriate reasons for doing the measurement as part of regular screening. And that is the position of the American Heart Association.

There are potentially intermediate positions. That if there is premature heart disease without other risk factors, should this not be measured as one of the things that might be looked to for lowering. The same thing is true of vascular disease.

There are now seven international studies going on on homocysteine lowering looking at clinical end points in either cardiovascular prevention or stroke prevention, all secondary prevention studies. But they are going to start reporting in the next couple of years. And I think that it will be possible then to at least respond to the issue of whether we have shown that homocysteine lowering has a benefit, and therefore its measurement can be justified.

MR. GOODPASTER: And regarding the data is that you do not know if it is related to the decrease in physical activity in older adults, which is also important obviously to look at. And you saw from the one slide that I had that even in older adults, that if you strength train that you can increase muscle mass.

And again, the problem I think is the lack of physical activity and lack of weight bearing exercise, I would not call it strength training, but it creates sort of a vicious cycle of disuse and further decreases in muscle mass. And again, it is just sort of a vicious cycle. The question is when can you intervene or where do you intervene in one life's cycle to prevent this decline in muscle.

I think that it is probably okay to lose some muscle as you get older. But the question is how much muscle can you lose, and how much strength can you lose before it starts becoming a functional limitation. I think that those are the

questions that we have to address now. Not only is it the loss of muscle or the loss of strength per se, but what is the threshold in the loss of muscle or loss of strength that translates into loss of functional capacity.

DR. HARRIS: If I could just add. I think that there are at least several studies, they are older studies, but they have looked at longitudinally master athletes, and show that even master athletes lose muscle mass with age. Now why people lose muscle mass with age, that this is part of "aging," I think has been very unclear. And I think that one area that really follows from Dr. Goodpaster's research is this question of infiltration with fat. Because I do not think that people have looked really physiologically at what happens when muscle is infiltrated with fat.

If you think about steaks, we all know that if you get fatty infiltration in steak, they went to get rid of the fat around the edge, but they want to keep the fat in the muscle, and that makes the muscle nice and tender. If you think about it, maybe that is the process that is happening to our muscles as we get older. That the fat is infiltrating and causing a physiologic change either in the muscle itself, or in the neuro-muscular junction, or in the circulation.

The fat actually infiltrates. If you look carefully at where the fat is coming, it is infiltrating into the fascial planes. In agriculture, this is called skimming fat. And that

is where the nerves and the blood vessels are also.

So I think that we probably have to stop thinking of the fat as being an innocent filler, and really start thinking about what it is doing physiologically, and how this could have an impact on muscle function, and also increase the loss of muscle with aging.

DR. ROSENBERG: I think that it is also true to point out that when we talk about the composition and quality of muscle and the changes with age, not only is there a question of the presence of fat versus muscle in our muscles and thighs and so forth, but there is a change in the ratio of the kind of muscle fibers. And I think that we need a better understanding of what the implications of that are with respect to loss of strength and its relation to mass. And also perhaps, as Dr. Harris has suggested, the potential interactions between local fat infiltration and different kinds of muscle function with regard to their utilization of energy sources and so forth.

MR. ANAND: Mr. Herrard.

MR. HERRARD: Yes. I am Vladimir Herrard, and I am editor of the Aging Newsletter. So my question is not academic. It is more of a pragmatic question. I have two actually.

One is besides the Older Americans Act programs, how else can the low income seniors go about getting more nutrition? I guess that one of the ways would probably be to

frequent their grocery stores, to get someone to go shopping for them, cook for them, and talk to their doctors about where they can get cheaper foods that are nutritious. That is one question I had. That is more of a pragmatic one.

MS. WELLMAN: Because so much state money and federal money goes into maintaining older adults in nursing homes and long term care, especially in my state in Florida, most states are getting very serious about providing an array of services that helps maintain older adults at home, which is where we all want to stay.

So in Florida, for example, we have community care for the elderly. And that program particularly supports older adults who are what are called nursing home eligible. And they are usually dually eligible, Medicare and Medicaid folks. And in the State of Florida, they will provide services, again depending on how many people are asking for the services, shopper, personal care, homemaker.

People will come in some situations to prepare meals for you, and make sure that you are hooked into as many community services as possible. And yet, it is important that those services be coordinated. So most states are recognizing that an array of services are needed, but they need to be coordinated, and there needs to be care management. And again, because these people do go in and out of the hospital and in and out of rehab, someone needs to be sort of coordinating that

system.

So states are making serious efforts across the country to provide those services in the home, but we are still a long way from enabling all older adults to stay at home.

MS. HERRARD: My second question had to do with facilities. I was just wondering that since we are having a whole symposium on nutrition today, just how aware are the different care facilities, such as the skilled nursing facilities, the senior housing, and retirement communities, are about some of the things that you have been exposing today about Vitamin A, Vitamin B, Vitamin C; And if they do not know as much as they should, what can they do about getting more of that nutrition for their residents?

MS. WELLMAN: I think that we have a serious staffing issue with most of the places where many older adults spend their last years. We all know that the health care system has changed dramatically. The best way to describe it is to explain to people outside of the system that a hospital today is like an intensive care unit was before. A nursing home is like a hospital. An assisted living facility is like a nursing home. We have ratcheted it all the way down.

But what we have not done is put adequate staffing with the skills that are needed for those more needy older adults at all of those levels. We are shortchanging everyone at every level while we are popping them out of the hospital

much earlier. So we have a professional expertise.

My dad was in an assisted living home. There were 250 people in that facility. Fortunately, it was one of the nicer ones in South Florida. There were two RNs in that facility. There was no dietician. I was the dietician for him, but that was it.

Another issue across the country are the personal board and care homes, which have no licensure requirements. In my county, in Dade County in Miami, there are over 500 personal board and care homes. And if you only take in two or three older adults, no one comes to visit you to see how you are treating the older adults. It is a real cottage industry in many parts of the country.

Often, the families will turn over the Social Security payment to the individual homeowner, who is taking care of two to three people. They have no training on the special needs of older adults. We are concerned about food safety issues, food scrimping issues, not feeding these older adults.

We really need to kind of get into the system, and see whether we are matching the quality of care with the skilled personnel that are needed in those different levels, and we are far from doing that.

MR. ANAND: Dr. Rosenberg.

DR. ROSENBERG: I think that it is fair to say,

speaking as a physician, that our health care system is not anywhere close to or as well oriented to the prevention of disability and the use of nutritional and other kinds of tools to do so, as it needed to be. We are not going to be able to deal with the changes in morbidity and so forth with an aging population by a classical medical care system. So we need those kinds of functions that Nancy Wellman talked about.

We also need to increase the element of preventive care, and I think that nutrition being an important part of that in health care practice. I think that the demand for that is going to be particularly strong with respect to an aging population. But I think that the ripple effect of that has to go all the way through life.

MS. WELLMAN: I think that there is a tendency to look for that silver bullet. We have talked a lot about individual nutrients. But in the meal programs that we are providing around the country, the average person is only getting five meals a week. For you and me, that is a semi-starvation diet. I eat probably 20 to 21 meals a week. Five meals a week for many of our older adults are simply not adequate. It cannot just be those five meals, whether they come to the home or whether the people go to the meals. There has to be meals on weekends. There has to be special meals for special diets.

There has to be someone who individualizes the types

of nutrition care, because we need to focus on really individualizing the kind of nutrition services that we provide including meals, if we are serious about keeping people at home.

MS. HERRARD: I hate to take up too much of your time. I wanted to ask one follow-up question, because you did talk about staffing. Basically, because of the staffing situation, when you say staffing, do you mean nursing staffing or do you in fact mean dieticians, do there need to be more dieticians?

MS. WELLMAN: Both. And we need just more staffing in long term care facilities. Many long term care facilities are very careful about who they allow to feed their residents. And usually, they only allow CNAs to feed the residents, because the facility is very worried about the liability, that if someone chokes to death that they will be sued.

So what we are satisfied with is a slow starvation, because we do not have enough other staff, or we will never have enough CNAs to feed everybody. We just do not get around to feeding a lot of people. The best nursing homes have an all hands on deck. Everybody from the administrator down feeds everybody at mealtime. And then we have less people leaving the facility to go into acute care, and we just have a better situation. So skilled nursing, certainly more nursing, but certainly more dieticians.

MR. ANAND: We agreed to have more time in the afternoon for questions and answers. So I am only going to have two more questions, one here and there. Please, go ahead.

MR. CANTOR: Mark Cantor, the University of Maryland. A question for Dr. Sowers. In your discussion of the inflammatory response, inflammation in osteoarthritis, I do not recall whether you mentioned anything about fish oils. Maybe you can comment on any relationship between the Omega-3s and osteoarthritis.

And I also wanted to ask you about the C-reactive protein that you mentioned, if this is the high sensitivity C-reactive protein that is being associated with cardiovascular disease risk? If you comment.

DR. SOWERS: I am actually going to answer your last question first, if I may. The data that you saw up here was actually the high sensitivity CRP data. One of the problems has been in the past that the reason that osteoarthritis was not considered an inflammatory disease is because the assay sensitivity actually cuts off right at the point that osteoarthritis begins to present itself. And so not until you begin to see the assay results, like I showed you here, does this begin to make sense. To my knowledge, there are no studies that have examined fish oils and looked at their response.

MR. ANAND: Is there anyone else?

MS. CULBERTSON: Yes. I am Molly Culbertson, and I am with public health for the State of Delaware. I have long term care experience, and am currently working at the other end with children. So I see it from both sides. And I could not leave without saying that I think that we are overlooking a big factor, and that is teeth. Medicaid does not pay for dentures. A lot of our old folks simply do not eat protein foods, because they cannot chew them, or their mouth is too infected with pain to eat properly. And I just meant that as a comment, but if you could comment further.

DR. ROSENBERG: I might just add to that that there is now increasing evidence that obviously people who do not have teeth of ill fitting dentures are not going to eat well. But the question is what about the other direction. And I think that nutritional deficiencies contribute to dental problems, and even specific nutrients. It should not be surprising that there is now data that indicates that Vitamin D deficiency not only results in demineralization of bone, but also in the tendency to loose teeth.

MR. ANAND: We are going to break for lunch, and please have a nutritious lunch. And come back at 2:15.

(Whereupon, at 1:07 p.m., the symposium was recessed, to reconvene at 2:15 p.m., this same day.)

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A F T E R N O O N S E S S I O N

(2:15 p.m.)

MR. ANAND: We are ready to come back now, so please have your seats. You know, we are very happy in USDA to have such a wonderful leadership. So please welcome to the second half the Deputy Under Secretary Julie Paradis. Julie.

(Applause.)

MS. PARADIS: Good afternoon, and welcome back. I think that it is always a sign of a successful symposium when so many people come back after lunch. So I know that this morning must have been as interesting for you and as productive as it was for me. And we are delighted to have you all here today. And thank you for coming back to what I am sure is going to be a truly fascinating afternoon.

Let me just ask before you all get settled in if all of the baby boomers in the auditorium would stand. Everyone who considers themselves a baby boomer, on your feet. All right for the baby boomers.

Well, of course, we are not a representative group I do not think of the American population. There are a lot of reasons why we have so many baby boomers here this afternoon. But I suspect that is one of the reasons that we have got such a good crowd after lunch. That this is something that is not only of great professional interest, but personal interest as well.

As a result of what we all know already and what we are going to learn this afternoon, I am sure that we are all going to be part of that group that lives beyond 100, and I cannot wait.

It is indeed my pleasure to be able to introduce this afternoon presenters. And we are going to go ahead and get started. I know this morning that there are presenters who wished they had more time, so we are not going to waste any time. We are going to get right to the presenters, so they have got as much of this afternoon as possible to make their presentation.

And I am delighted that first out of the block is Dr. Barbara Tilley. Dr. Tillery is a professor and chair of the department of biometry and epidemiology, that is a mouthful for a policy maker, at the Medical University of South Carolina. And she is also director of the coordinating center for the National Institute on Aging's resource centers for minority aging research at MUSC, the Medical University of South Carolina.

Her independent research has been in clinical trials with applications to stroke, cancer prevention, rheumatoid arthritis, and minority health outcomes, with a particular focus on aging.

Dr. Tilley received her undergraduate degree in mathematics from California State University. She received a

M.S. in biomathematics at the University of Washington, an Ph.D in biometry at the University of Texas, my alma mater, the school of public health. So we are delighted to have Dr. Tilley with us this afternoon.

(Applause.)

MS. TILLEY: Thank you very much. I am very happy to be invited to this conference. And I know that I have a difficult time spot being the first person after lunch. I am sorry that we have to have the lights down a little bit, but I will do the best I can.

I am talking today about minority aging achieving health equity. And you will see by the end of my talk that I perhaps would like to do a little more than that. Funding for my work has been provided by the National Institute on Aging, the National Institute for Nursing Research in the Office of Minority Health Research, which has been funneled into the coordinating center that I am running for the research centers on minority aging.

I also have recently been funded by the Agency for Health Care Quality and Research to conduct the South Carolina initiative to eliminate health disparities in African Americans. So I consider that they have contributed a little bit to the efforts today.

You heard this morning that the population of 65 and older by race and ethnicity is changing. And that by 2050, if

we look at the graph, we see that the proportion that are non-Hispanic white is decreasing, while the proportion that is black and Asian Pacific Island and Hispanic is increasing.

Now currently, when we look at poverty statistics, and we look at persons who are age 65 and older living in poverty by race, we see a much higher proportion, over 25 percent, of non-Hispanic blacks who are living in poverty compared to around 9 percent of non-Hispanic whites and close to 20 percent of Hispanics.

Now we have some data in South Carolina to look at food stamps. And a very surprising number to me was that of the people who are black in our state and age 61 and older, almost 15 percent are receiving food stamps. And that we know is probably an underestimate of the number of people who really need to have food stamps. So it is a very interesting figure, and I think it is a sad one. I have here at food stamps are available. But I think that it is a sad commentary that so many people need to have food stamps.

Now the scary thing for me too is looking at the poverty of the future. The Commonwealth Fund put out a president's message, which had some very sobering thoughts in it. And that is that retiree health benefits and pensions are covering fewer people in the United States. We see the rising number of working uninsured, and we are seeing a similar trend in terms of pensions and benefits. Which means that tomorrow's

older population is actually going to be less financially advantaged than our current population that is aging.

And there is certainly no evidence to suggest that the minority disparities in poverty are going to be eliminated, or that there will not be a greater disparity when we look back at the poverty situation for those who are over 65.

Another issue with respect to minority health is the issue of what is old. This is life expectancy in the United States by gender and age. And we see that at birth that a black male has a much lower life expectancy that a white male, about 60 years versus 80. As the population ages, by age 50, there is still a very large disparity in terms of life expectancy. And it is only when we get to the very oldest old, which is age 85 and older, that we see that the two lines converge.

But does older really mean a good quality of life. N. Haynes had a similar question in there that would you say your health in general is excellent, very good, good, fair, or poor. And when we look at the response to this question by race and ethnicity, what we see is that if we look at the oldest old, which would be the black column on this graph, we see that of the non-Hispanic blacks who responded to the questionnaire, about 55 percent responded that they were in fair to poor health, as compared to the non-Hispanic whites where we had about 31 percent.

So the fact that the life expectancies are converging does not necessarily mean that the life quality is getting better.

The other thing is when we look back at those earlier age groups is we see that the morbidity and mortality health related quality of life for someone who is African American and 50 is much more similar to someone who is non-Hispanic white and say 60 or 65.

And that has led us in our work both at Henry Ford Health System where I was in Detroit before I went to South Carolina and in our work in South Carolina to define old as greater than or equal to age 50 rather than the original cut-off of 65. With the idea that we have to have an impact at an earlier age in the African American population in order to really make a difference in health disparities in the long run.

Now the other thing is that if you look at the six leading causes of death, it is interesting for black and white men and women. They are really the same. The order might be a little different from gender groups, but the fits are the same. And if you look at the 55 to 64, the ones in red, malignant neoplasms, heart disease, diabetes, and cerebral vascular, we have talked about today that they all have nutrition components to them.

And you will see if you look at the statistics that the African American man and woman are at greater risk of dying

from any of these diseases at a younger age. When we look at the older ages, the injury drops off, and we add another respiratory. But we still see these four nutrition related causes of death. And again, you still see the disparities in the mortality rate.

Now another thing is just to point out that we just cannot forget about things like osteoporosis. These are data from South Carolina from 1981 to 1999. And although in this case that we see that the non-white population has a lesser rate per 100,000 of hip fractures, we see that there is an increasing trend from about 225 to almost 375 in then on-whites, and an increasing trend also in the whites. But we cannot say that there is no problem with hip fracture in the minority population.

In terms of racial and ethnic differences, there has been a tremendous amount of research going on to not only report on these differences, but try to explain them. And many explanatory variables have been used, socioeconomic status, insurance status, stages of disease. And for some conditions, this explains the differences. But for many others, it does not. There still remains some unexplained differences. And there is a nice synthesis of the literature put out by the Kaiser Foundation just in October of last year that talks more about this.

We have seen differences in medical procedures. In

my work at the Henry Ford Health System, we looked at thrombolytic therapy for men who were coming in with suspected MI. And it turned out that the African American men were much less likely to receive thrombolytic therapy than the Caucasian men. And the only thing that we could differentiate the groups from was the presenting symptoms. Where the African American man was more likely to be classified as unspecified chest pain. And the Caucasian man was classified as rule out myocardial infraction.

We also know that there are some physiologic differences. We heard the discussion today about distribution of fat. And we certainly know that there are issues of racism. There have been some studies that have looked at the impact of racism on health outcomes. There have been studies looking at provider behaviors.

So it is a very complex problem. So what do we do about it. I have seen talk after talk documenting the disparities, and people trying to explain the disparities. At this point, I think that what we need to do is we do need some more research. But I would prefer this research to be research measuring of progress in eliminating these disparities, and using this research to guide action. I would like to see less research simply documenting the disparities. And I would like to see more targeted action.

One of the ways that we can document our progress in

eliminating cross-disparities is to use secondary data systems. But I think that there are some issues that have to be addressed. There are certainly potentials for mis-classification of race and ethnicity. There have been some studies that have looked at this issue. And it seems to be less a problem for the African American. But for Native Americans, there is a huge misclassification bias. And for Hispanics also, there is a lot of misclassification.

There is also under-representation in Medicare, especially if we talk about the age limited being moved down to greater than 50. We cannot rely on the Medicare data sets to give us the answers. And using Medicaid limits our research to only the low income.

And someone told me once that people talk about half of African Americans being poor. Well, that means that half of African Americans are not poor. And that means that we are neglecting that part of our population, if we restrict our studies to only those who are low income.

And in fact, my work at Henry Ford Health System showed that in a group of African American patients of the health system, who were fairly advantaged and had good access to health care, we still could document disparities in health outcomes given access and given income, et cetera.

So I think that although access and income contributes to the health disparities, if we solved all of those problems, we

still would have more to do.

Now the solution to these data needs include the idea of redefining older to be younger in a sense. More over-sampling of older minority populations. We do some over-sampling now of minorities, but we need to do a little more focusing on older minorities. It would be good to collect some data on nativity, so we can look at some of the impacts of migration. And also, it would be nice if we could add just a simple census item on health, even if it was only that one simple question that we looked at earlier.

There was an article in 1999 in the American Journal of Epidemiology that showed that simple healthy question was a very good predictor of fairly subsequent mortality. So a simple question like that on the census would be helpful.

Also, as we mentioned, not all data sets can solve the problem of giving us the information that we need. The State of South Carolina has something that is I think fairly unique, although I am sure that other states are starting to do this. And that is that through their office of research and statistics, which is not housed in a health facility but in the office of budget and control, they are linking as many public and private databases as they possibly can.

The Web site that I give here is where you can look at the kinds of things that they have available. And what they are doing is just gradually step by step breaking down the

barriers among the health agencies in the state. They are working now with Blue Cross and Blue Shield in trying to integrate those data, so they will have more data on private payers.

My new grant that I received from ARC is going to pay for the Medicare outpatient data, which they did not have, because they have very limited funds. And they are using data for a couple of purposes. One is that they use it to monitor the state funded program, which has been extremely valuable in being able to document successes and failures, and to quickly know that the money that you are going to put into a program is helpful.

But they also have a research review board that looks at proposals for using this data set for research. And if it is approved, they can go in and take the data sets, strip off the unique patient identifiers, and give you back a data set where the data is linked over time, so you can see what is happening to groups of patients.

And originally, they only had very limited data. Now they are even for younger people being able to link it to educational data. So it is going to be a tremendous resource. And it allows the state to monitor whether it is really is making progress in eliminating minority health disparities. And I think that it would be good if other states could follow their example.

The other thing that we need is more targeted action, more effective culturally relevant interventions targeted to minority populations. And more funding to minority health research and implementation programs. There are a lot of times when things are funded for the research side of it, and it is shown to be successful. And then it is dropped, and something else is tested by the researcher, and the implementation phase gets left behind. Now I am going to come back to these I think through the view of the RCMAR centers.

The other thing that I can think that we can do is maximize the value of funded centers that we have out there. I was looking at the different publications and the different projects that the research centers and minority aging are doing. And very few of them relate to nutrition.

Now here is a group, and you will hear more about it in a minute, that is poised and has the resources, and the staff, and the training to answer some of these concerning nutrition questions in minority populations. And it does not mean that a whole new infrastructure has to be set up. It would mean funneling some funding to do nutrition related research to some of these existing centers.

And there are many of these centers in the United States now. The Veterans Administration has some minority health research centers. CDC is funding a variety of different projects that are reaching out to the state. One is called

REACH dealing with diabetes for the states. And of course the Resource Centers on Minority Aging. And I know that I have not named all of them.

But I think that there needs to be some way to catalogue these centers, to figure out what the centers are doing, and what the resources are that these minority health related centers have available. And then have other agencies that have questions be able to tap into these resources.

The Resource Centers for Minority Aging are located across the country, as you can see from this map. And this is their mission. And it is kind of an interesting one. The first thing that they are charged to do is to develop strategies for the recruitment and retention of older minorities in research.

One of the issues that people talk about when they talk about implementing interventions, successful interventions in minority populations, is that we often do not have enough information about how an intervention does work in a minority population. And things that are culturally acceptable or for other reasons work in a non-Hispanic white population may not be transferrable to a Hispanic inner city population.

And so what this grant is doing is it is setting up these centers around the country that have components that are focusing on recruitment and retention strategies. And so there would be no reason why they could not be turning some of their

attention to nutrition related studies. Most of the studies that they are doing now are more related to understanding community needs, what people think about research, and what it takes to get people to enroll in research.

The other thing that these centers are focusing on is measurement tools. There are many, many measurement tools out there that were developed in Caucasian populations, and have not necessarily been validated in minority populations. Now that does not mean that they will not work in minority populations, but it does mean that we have to ask that question. And often, we do find that there are differences.

For example, one of the investigators that I worked with at the Henry Ford Health System was looking at a meaning of illness questionnaire. And the items that measure stress in the questionnaire really did not track very well in the African American population. And she did some focus groups and some discussions. And what it appears to be is that these stresses are so minimal compared to the other stresses of life in the African American population that she was measuring, that they were almost meaningless.

The other thing that we have to do is establish mechanisms for developing researchers who are minorities to do minority health research. And there is a large program in the RCMARs to do that, to fund and develop mentor pilot investigators. And in fact, that at time, there are 62

minority investigators who have received pilot funding through the RCMAR centers. And of those already, and this program has only been going a little over two years at the time that this data was collected, which was the end of last year, eight of the 62 had actually got external funding, which I think is really remarkable. There have been 94 presentations by this group.

This is the RCMAR Web site for those of you who want to know more about the RCMARs. All of their publications, et cetera, are listed there.

I guess that where this all brings me is that I think that we really have to think bigger than the way that we have been thinking. When I first got into the field of minority health research, the key word was let's reduce minority health disparities, kind of a modest goal.

More recently, if you look at the grant applications that are out there, the requests for proposals, you see eliminate minority health disparities. I think that a bigger goal and a better goal, and a stronger goal. But if you think about it, let's look at hypertension, for example. If we look at the national rates of control of hypertension, they are fairly dismal, in the mid to high 20s depending on where you look, a percent of people with hypertension that are controlled according to the new hypertension guidelines.

And yet, there are more African Americans that are

out of control with respect to their hypertension than Caucasians. So if we want to eliminate minority health disparities, we would take the African Americans and move them up to the level of the Caucasians. Well, to me, that is not good enough. Moving a group up to be equal with a group that is not doing well is really not the answer.

And so what I would like to see is that we make a real goal, not just eliminating minority health disparities, but living toward optimal health. And I think that the nutrition component of health is so important. When we look back at the diseases, the causes of death, and we look at the morbidity that is associated with things like diabetes, I think that nutrition can play a very important part.

And I think that trying to pool our resources to take advantage of the things that are going on and to try to enhance the research that is going on with respect to nutrition and enhance the implementation programs with respect to nutrition are extremely important for progress to be made in this area. Thank you very much.

(Applause.)

MS. PARADIS: Thank you, Dr. Tilley, for that really interesting presentation.

Our next presenter is Dr. Connie Bales. Dr. Bales is at Duke University. She is the associate research professor of geriatric medicine, and the associate director of the Sarah

Stedman Center for Nutritional Studies. She is also a fellow at the Center for the Study of Aging and Human Development at Duke. At the Durham VA Medical Center, Dr. Bales is associate director for education and evaluation, geriatrics research, education, and clinical center. Her work focuses on the various aspects of micronutrient nutrition as it affects health and chronic disease in later life, and the development and impact of foods that produce or restore health in community dwellings and frail individuals.

Dr. Bales completed her Ph.D in nutritional chemistry at the University of Tennessee. And she is going to talk to us this afternoon about food marketing for the older adult. Dr. Bales.

(Applause.)

MS. BALES: Thank you very much. First of all, I want like to thank the folks here at USDA for inviting me, and especially to thank you for your continued and increasing support of my favorite topic, which is nutrition and aging.

My topic is very different. There is almost no resource literature, and there is very little data. So you can sit back and relax, and maybe spend more time just thinking about the ideas that I am going to offer to you. Just like Dr. Takamura created this image of that apple pie, which I still want and probably will have to have before midnight tonight, thank you very much, the topic that I have is also one of

images, of visual images.

I am going to talk about food marketing, food promotion, whatever you want to call it, what we do when we give information to older Americans about food products and nutrition supplements, and other things related to diet that we sell through a private enterprise approach.

As I said, there is virtually no literature on this topic. There are a few papers done in the 1980s, which seem to have very little relevance to now in my opinion. I came upon this topic by accident, and have been researching it and thinking about it for awhile.

And it is one that at least provides I think some food for thought, if you will ignore the pun. Some of the papers, you may not be able to see so well. This is a Viagara ad. But you will notice that sex sells at any age.

So I approach this topic as much as a gerontologist. At Duke, we have a very much disciplinary approach. And I will try to look at all aspects, particularly because we can I think apply what we learn from the marketing of any type of health product like drugs and pharmaceutical products to older people, and apply that to what we are probably going to see increasingly, and you will probably notice with the use of health and health claims to compete in a very sophisticated food market.

Some of the messages that we see are very direct in

advertisements, and some of them are implied. But we know that most Americans, 85 percent according to a recent survey by the American Dietetic Association, 85 percent of the people say that nutrition and exercise is important to them.

And so in case you are still wondering why we are talking about this, I thought that I would kind of try to point out why we might be interested in food marketing even if we are not food marketers. If you are a physician, or a physician assistant, or some type of a care giver, your patient may come to you after having heard some advertisement about some food or some supplement with questions.

Now if you are able to handle those questions, if you are not too baffled by the information, you may be able to parlay that into an improved diet for your patient. If the information is very misleading and confusing, it may actually cause your patient to wonder if you know what you are talking about, because you do not agree with what they heard in the advertisement.

If you are a nutritionist, the same thing happens. The consumer comes after having heard some type of a claim in the magazine, or newspaper, and usually a television commercial, which has the most impact. And they may have changed their diet behavior. This is because most people do not ask for a dietician before they change their nutrition behavior. They just change it, and they may mention it or they

may not later.

But the point is that if they have got good information, that is great. We will probably never know about that segment. But if they got something that worsens their nutritional status or interfered with let's say their therapeutic diet in some way, we will hear about it, and it will create more work for us and more headaches down the road.

And certainly, for those of you who might be in some way advisers to or consultants to food manufacturers or trade associations that promote food products, I think that this is really the area where there is the most potential to have an impact. The advertising again is changing consumer behavior. If a nutritional status is altered in a way that is improved, what fabulous PR for your products. You can publish that, and you can use it to do sales.

But if your nutritional status has worsened, this may lead to legal issues. And, of course, the demise of the entire product line. Now this may sound a little far fetched, but I hope that I will be able to persuade you that when you are talking to people with perhaps multiple health problems and you are giving them information about questionable cures and remedies that really may interfere with their health.

So what we are going to do is combine a lot of different fields to science, medicine, and a little bit about psychosocial concerns, along with what we have been hearing

about all day about what we know in the biomedical areas.

And I think that if I had one message for you, that it would be that you cannot completely separate advertising from education, from health education. I was at a conference this year on medical communications that VA sponsors. And there was a physician there who is the adviser to the television program ER. And he was talking about this issue. That people see a segment of ER, and they think that they have learned a lot about some medical problem, that they use that as information.

And his point was that ER is designed to entertain you. It is not designed to educate you about medical matters. And in the same way, a food advertisement is designed to sell you the product. It is not designed to educate you, but it does. You know, people think that what you see on television as an advertisement is factual. So you are not ever going to be able to separate them. And so the question is what is the impact of that situation. And we know now what we suspected all along. But there is information that substantiates that what people know about nutrition does indeed their nutrition behaviors.

What I would like to do just to sort of illustrate this in the time that I have is to take four major kinds of areas and just give examples from each of those as to some of the concerns that I think that we need to pay attention to.

I will start with the demographic and societal concerns, just to look at those. And you have heard a lot about those already today, the predominance of females in the older age group, increasing numbers of minorities. And cohort differences in sources of nutrition information is a new one that I will add.

I will not spend much time on this. We have already heard about the feminization of the older population. Now this has an interesting implication for advertisements. We may see more women in advertising. We also see women providing a care giver role for older people of both sexes. And so advertisements for health related things may be appealing to women as care givers, as well as consumers.

And as we said before, women need to be very active and self-sufficient. Because we have found that often they are the ones who are giving the care, but not necessarily getting it. While most elderly men have a spouse, in other words most elderly men are married, most elderly women are not. Because most elderly women who are advanced ages are not.

And we have already heard a lot about what is going to happen in terms of the increasing proportion of minorities and their vulnerability. How this will be reflected in marketing, I do not know, but it certainly needs to be considered.

And then the third area would be to think about some

of the complexities of the societal pressures in the marketplace. Every year about 15,000 to 20,000 new food products hit the market. They do not all make it. But you probably notice this yourself when you go to the grocery stores. It is a pretty overwhelming array of things that you have to choose from. And most of you, in the younger age groups anyway, have a lot more health education than older cohorts do. So it is a little bit overwhelming.

And although this is old data, this is kind of lagging behind 1995, but it shows that what is spent on food advertising is, of course, increasing every year. And I have read about 4 percent of what you pay for a food product is spent on advertising. And that is probably more for certain types of products.

What we see is that each cohort or each generation of people carry their own influences of the area in which they have grown up, and matured, and have lived their lives. And so their comfort level with different sources of information will change. So I wanted to point that out a little bit by talking about the differences in people in different cohorts.

We are interested in people who are older right now, but we are also real interested in baby boomers, and we all stood up already. And what is going to happen is we move in a completely different proportion into the older age groups.

If you look at the whole population, look at the

number one source of information about nutrition, and it is media. And I think in the future that we will be able to add Internet type information to that as well. There is not a huge number of people in the over 50 and over 60. About 12 to 14 percent of Internet users are in that age group. But more than 50 percent of Internet users are in the baby boomer era. So as we move into that, and I will comment a little bit more about that later, I think that we will see that as another way of information coming to us both reliable and unreliable about food products.

So if you will just think for a minute about the different cohorts. We will start with the youngest cohort and move backwards, realizing that the oldest cohort has experienced everything that I am going to mention.

The people who were born in 1950 to 1970, I just rounded this off, what do they experience. Well, they have seen some sad things, the Vietnam War and political assassination. But by and large, they have seen fairly comfortable times. There is a lot of very impressive medical and technical advances. Computers have completely changed the way we live.

If you move back to people born in the 1930s to 1950s though, you see a real different scenario. You see a lot more deprivation through rationing during World War II and the Korean War. The effect of the Great Depression, I guess I will

carry with me to my grave, because my mother is carrying it to her's, and she is going to make sure that I never forget about it.

And the Cold War. Actually, I was born a little later than the 1950s. But I still remember going down to the bomb shelter. You know, the whole idea of being sort of stressed by the wars and the financial concerns created different kinds of things. I also remember my mom talking about electricity. When she was a child, the first time that they were able to read at night. That is not that long ago, and yet it is a big, big difference.

And one of the examples that I have seen is that if you want to sell me a vitamin, do not sell it to me two for one. You know, I may think I do not know. But my mother thinks that is just great. She would buy that vitamin, because economics and getting the most for your money is a lot more important to her as a quality feature than it is to me.

Now if you will just go on back to the people born in 1910 to 1930. They have seen the advent of the telephone, the automobile, as well as the World I aspect. So a person who was born in that age range has seen all of the things that I just mentioned. Do you think that they might be a little skeptical about what they see on TV? I think so. They tend to often make their own decisions. Self-medication and self-treatment is often the rule there, because it used to be the only option.

And so there is a susceptibility both good and bad to handling things on your own. So this is just some food for thought about the way that different cohorts may respond to the same information.

The second area that I wanted to mention is one that we have been talking about all day, and that is physical and medical effects. And I think that it is probably one of the ways to segue into the importance of not giving misinformation about health.

We have already said that reduced calorie requirements lead to lower nutrient intake overall as we get older, and this is certainly the case. It means that we eat less food, and it is therefore the nutrient density that we need in our diets is very high and sometimes difficult to achieve. This is an opportunity actually for commercialized products that have been fortified with extra nutrients to be a real positive. I do not know that we will see that or not.

Also, I want to mention something about the sensory changes that occur, because this would affect the way that people perceive advertisements. Hearing impairment is up. Almost 50 percent of people 85 years of age and older have a hearing impairment. And I like this one because it describes my dad. Only 8 percent of hearing impaired persons over 65 use a hearing aid. My dad only uses his 8 percent of the time, and that is when he is on the phone. So I think that the hearing

issue would, of course, would affect response to any type of audible type of information.

Likewise, 90 percent of older adults require eyeglasses that would affect their ability to read the fine print. So the older person in the grocery store trying to deal with nutrition labels. I do not know about you, but I think that nutrition labels are fairly hard to go with anyway unless you understand the basic concept a RDA. RDA is not exactly a household word for a lot of people of any age, and certainly not of people in older cohorts.

In addition, I saw a study from the U.K. Actually, they were looking at food safety practices. And they looked at label reading. And they found that their elderly subjects understood "use by" and "sell by". They understood the concept, but 45 percent of them had trouble reading the label. I do not know if you have ever looked for an expiration date, but they are really tiny.

Just as an aside, also 70 percent of them had a refrigerator that was too warm to be safe. So I think that there are a lot of issues about food safety all kidding aside that are important for older people as we try to keep them in their homes, that we make better information available to them on packaging.

And then finally the most important, I think, is that we need to help older people sort out their medical priorities.

I have worked for many years in osteoporosis, and have struggled with frail little thin boned women, to tell them that they do not have to worry about controlling their calories and fats to ward off heart disease. That they could drink their milk, even whole milk, and that would probably be fine for them. But chances are they have been caring for their husbands debilitated by a heart attack and finally fractured a vertebrae when they came into the clinic.

You know, people, as we have said all day, have very different heterogeneities. They have a lot of differences. And this is true in their health. Not all health concerns have the same level of priority. You have to make choices. And you cannot follow a low salt, diabetic, low calorie, low fat diet and do a good job of it in many cases. So you have to make some choices. And some of the advertising that we see is very intimidating about health. And it has the opportunity to focus people on the wrong priorities.

I do not think that I need to mention this, because we have heard so much about morbidities already. But seven out of ten older people die from the top three, cardiovascular disease, cancer, and stroke. All of which have nutrition implications both in terms of prevention and management. And the prevention recommendations may not be the same as the management. You know, you may not want to eat too much fat in order to prevent a heart attack. But once you have got

congestive heart failure, you may struggle to get enough calories in during the day. So again, the recommendations may change.

The third point that I wanted to make was just to mention that the other component, the people that we really cannot even describe, those who are depressed, have fairly moderate to severe dementia, are living in some type of isolation. I do not even know how those people really will react and respond to advertisements. Their care givers will see them, and it will enter into their lives.

So it kind of brings me to just kind of throw out some question that I think it is real interesting to pursue with older people. And that is do you really want to see an advertisement that is realistic. We have never before, an most advertisements are not realistic now. So do you want to see an advertisement that portrays your health or your age in an accurate way, or do you want to see it kind of dressed up in about 10 or 20 years like many of them do.

This is sort of a denial thing, you know. I guess she might have menopaused, but she still looks pretty darn good, versus something that may be a more realistic view. And I will show you some images. Sex is used a lot to sell things at any age, and maybe that is what we want.

Even though I am not trying to pick on this product, that osteoporosis is not caused by aging, but it is caused by

ignorance. That is something, I think, that implies a guilt trip that is not really necessary. I was going to let you pick which ones are realistic and which ones are not.

(Laughter.)

MS. BALES: This is a more realistic picture. And I think that this is really important to think about. Because older people do not think they are old. If you ask them how old they feel, they will give you an age much younger than their chronological age. They want to be portrayed as competent, healthy people. And so it is a dilemma for food manufacturers. Because by doing that, you may imply that your product conveys a usefulness that it is really not going to do. There is not a fountain of youth available.

So because advertisers steer clear of negative images, they have the opportunity to kind of persuade in a way that is not quite accurate. And I think that it is harmless for us to sit and laugh about it. But in certain cases, it can have an ethical implication.

Older people are particularly susceptible to health fraud. And they in some cases spend large sums of money on worthless and even potentially hazardous schemes and plans. And this is not because they are senile or they are easily confused necessarily. Older people have usually experienced some pretty catastrophic health problems either personally or among their friends, and they are very susceptible. They are

out there looking. You know that if you work with older people. They are willing to try almost anything and do.

So there is an opportunity to really mislead and to take advantage of people in a way that can be risky to their health. I mentioned the self-help mentality with people like that. Every time I got home, my dad shows me a different thing he has taken for arthritis. And I just look through it for like toxic ingredients and say okay, dad. But this idea of medicating yourself is very prevalent, let's be honest. And there is an easy way to take this sort of idea of keeping hope alive and using it in a deceptive way.

Solutions. Legitimate companies need to stay very clear of the chance of miscommunicating information. The FDA regulates labels, and the FTC regulates advertising. And I was reading how they were sending e-mail messages to people who were making what they called incredible claims on the Internet about herbal remedies and diet supplements. But it is a huge challenge.

I wanted to just say that normally scientific information flows, I think this is a better one, from the scientific through health and professional organizations that help develop messages like this, the Dietary Guidelines that are intended for the public, and then go to industry media and consumers. What you do not want is the article in the New England Journal of Medicine picked up by the media and going

straight to consumers. That is what we get a lot, and then parlayed into sort of a marketing scheme.

Can education and advertising exist separate from each other. I would maintain no, that it is impossible. That we would like at least a little bit of overlap there. And it is there that we have the opportunity to really accomplish some good things in partnership with the product sector. And hopefully, what we would do is to use advertisements that are realistic that build on the wonderful quality of being older, and use that in a very honest and forthright way. Thank you.

(Applause.)

MS. PARADIS: Thank you, Dr. Bales. That was fun for people like me and all of the non-science majors in the auditorium, who have a little trouble understanding all of the other presentations about what is going on inside our body. This was a little easier to follow. I know that I have to take my $11 cheaters with me when I go to the store, so I can read labels.

We are running a little bit of ahead of time, Raj. So I wonder if we cannot go ahead and take our break, which was due at 3:15. Let's take it at 3:00, and come back here at 3:15. Then that will give us a little more time when we come back for the additional presentations. So we will see you all back here in about 15 minutes.

(Whereupon, a brief recess was taken.)

MS. PARADIS: We are going to ask people to go ahead and take their seats, so we can go ahead and get started again, and get the afternoon concluded. We have some people who are going to try to dash to National Airport to catch planes. So I think that we will want to move it right along.

Our next presenter is going to talk about one of our favorite subjects here at USDA, and that is the Dietary Guidelines, but sort of with a twist, Dietary Guidelines for the elderly, should there be special considerations. And I know that this is a subject that we have been interested in here, and I know that all of you are interested in it as well.

Our presenter is Dr. Alice Lichtenstein. She is a professor of nutrition in the School of Nutrition Science and Policy at Tufts University. She is a senior scientist at the Jean Mayer USDA Human Nutrition Research Center on Aging, and a professor of family medicine and community health. Dr. Lichtenstein conducts studies aimed at examining the effects of dietary factors on blood lipids in older men and in post-menopausal women regarding the risk of developing cardiovascular disease. Currently, she is studying transfatty acids, soy protein, and genetically modified oils on heart disease in older adults.

Dr. Lichtenstein received her undergraduate degree from Cornell in nutrition. She holds two masters degrees from Penn State and Harvard University. And she received a

doctorate in nutrition from Harvard. And we are delighted to have Dr. Lichtenstein with us this afternoon.

(Applause.)

MS. LICHTENSTEIN: Thank you very much. I would like to thank the USDA for putting on this conference, which I think has been very interesting, because it combines such a broad range of topics in the area of nutrition and the elderly.

What I was asked to speak about today was Dietary Guidelines, and should there be special considerations for the elderly. I think that the first question that we have to ask is are there changes associated with the elderly that would suggest that would suggest that special considerations be given. And I think that what we know very basically is that energy needs are decreased as individuals get older. And this is due to body composition and less muscle mass, and a number of speakers have indicated, as a high percentage of body fat. Also, because activity levels do go down with aging and the basal metabolic rate goes down. However, despite the lower need for total energy, nutrient needs are either unchanged or increased.

Now I would like to preface my remarks by saying that what I am going to be talking about is what we call the healthy elderly, not frail individuals, and not individuals that have multiple medical disorders. But really, older individuals that are relatively healthy, and that want to remain healthy. And

also, I am going to be speaking from a public health recommendation, and not necessarily from what one would advise an individual given special considerations. But from a public health perspective, what you would recommend.

Now I do not expect anyone to read this whole slide, nor are all of my slides going to look like this. However, what I did want to point out is that there are physiological changes that do occur with aging. We just spent the better part of a day hearing about some of those.

I think that what you should note is that in general that all of the arrows are going down. Occasionally, things like chronic blood loss will go up. But again, most of the functions do go down again or the altered pattern goes up.

The thing to remember though is although we can document physiological changes with increasing age in individuals, that does not necessarily mean that there are compromised. Because we do have a fair buffering capacity and have access capacities. So although we can identify changes, it does not necessarily mean a priori that they are going to interfere with nutrient status.

There are general factors again. I almost feel like almost every one of the speakers to this point have already addressed all of the issues that I am going to bring up. So maybe you should just sort of think of this as a summary. But there are general factors that do contribute or can potentially

can contribute to compromise nutritional status. And they do center in on areas that are going to impact on either the acquisition of food, or the preparation of food, or the actual intake.

Changes, as have been mentioned, in the oral cavity that are going to impact on the types of food that older individuals will be able to consume. Issues related to mobility and their ability to actually acquire and prepare foods. The sensory perception that we just heard about that might interfere with their appreciation of some foods. And again, issues related to preparation of food.

There are also social-psycho factors that can contribute to the nutritional status of older individuals. And this can be loss of companionship due to the loss of a spouse or other individuals. An older female may have been used to preparing food first for a family and then for her spouse. She is alone, and it less motivated to actually prepare food. As we heard about, mental status, depression, mental deterioration. And alcoholism which is a concern to the elderly. Economic issues, living on a fixed income, being limited let's say in where they can go shopping because of distance. And therefore, they might have to spend more on foods or have decreased variety. Nutrition knowledge, and increased susceptibility to food fads.

They do have more time to read. There is a

motivation to get the answer. And anything that may promise to be beneficial, they can be susceptible to. And then housing, changing in housing status. They may have to leave their home, and have less control over what types of foods are available, or actually whether they can prepare it.

So factors that contribute to food choices in the elderly really do center around costs, availability, ease of preparation, and texture. And that would have to do with chewing.

Now can we give targeted advice to the elderly with respect to nutrition. And also, can we give advice to those individuals who are responsible for providing, or helping, or implementing older individuals' food intake.

And if we look at it from the perspective of various food categories. And we keep in mind that energy needs do go down, but nutrient requirements do not, what we really need to think about is how to encourage elders to get the nutrients that they need in an adequate amount while still consuming less food.

So if we go through the food categories, if we think first about the bread, cereal, and pasta group, that the choices should be primarily whole grain or fortified, and varied within each day. Whole grain because of issues related to fiber, and the elderly getting enough fiber. Fortified, it will just increase the probability of meeting nutrient

requirements, and vary even within a day and certainly within a few days, because we know that different grain products do provide different nutrients.

The practical advice is that breakfast cereals are a good source of both whole grain products, and also they are frequently fortified. And they are relatively easy to prepare, and are easy to store.

Within the vegetable group, the general recommendation would be to focus on deeply colored vegetables that tend to be nutrient dense. A simple way of conveying that is the ones that are dark in color. And also to emphasize that fresh, frozen, or canned forms are good sources of nutrients, fiber, and phyto-chemicals. And that is because fresh fruits and vegetables tend to be relatively expensive, and they tend to be highly perishable. Frequently, in the supermarket, we can only buy large quantities of them. And these are all sort of barriers to supplementation for older individuals.

And by emphasizing that frozen and canned forms are just as good, depending on what they prefer with respect again to storage and to cost, all of these issues. Hopefully, it will allow them to consume more vegetables. Now the emphasis should be on deeply colored vegetables. And it can be something as simple as using romaine lettuce as opposed to iceberg lettuce.

And you can say well, is it going to make that big of

a difference. Well, there are a lot of little changes. Yes, it probably would. Does that mean that somebody should be discouraged from using iceberg lettuce, if that is what they are used to and want to. Obviously, no, because we want to maintain fruits and vegetable intake. But these are ways to really steer elders to maximizing nutrient intake.

Similarly, with fruits. Deeply colored fruits tend to be more nutrient dense. Again, you can use a variety of different forms for the same reasons that we are recommending that for vegetables. And although juice can be a good source of food and some nutrients, it does tend to be lower in fiber than other forms of fruit.

Now again, with fruits and vegetables, one issue that came up is texture and dentition, and whether it can be chewed. But there are a lot of different ways of preparing fruits and vegetables that do not compromise nutrient value, that can also allow elders to consume them.

The milk, yogurt, and cheese group is of some concern. Because as we heard, older individuals do not tend to get enough calcium. The recommendation still is to emphasize low fat and fat free products. The leading cause of death in older individuals as younger is cardiovascular disease. And it is responsible for one out of the two deaths of older individuals. So older individuals are still at an increased risk of developing and succumbing to cardiovascular disease.

And the best advice that we can give on a population-wide basis is to use low fat and reduce dairy products.

Now that does not mean that you cannot have one person who does not have factors for cardiovascular disease and loves whole milk. You would not want to discourage that. But just on a general basis, it probably is efficacious.

There is a wide variety of reduced lactose and fermented products that now are commercially available in most supermarkets, and are not incrementally expensive relative to the more standard products. And because there is a higher incidence of lactose intolerance in older individuals. And some individuals who do not have lactose intolerance think that they have lactose intolerance, and have grown up not drinking milk. It is important to emphasize that a variety of different types of dairy products is advantageous with respect to calcium and nutrient intake.

And lastly, milk is the more reliable source of Vitamin D. If an older individual does have limited sun exposure and lives in northern climates, and does not drink milk, then probably their Vitamin D status should be assessed.

For the meat, poultry, fish, dried beans, eggs, and nut group, again the emphasis on lean cuts of meat and poultry without the skin, again getting at the issue of saturated fat intake. Emphasis on good sources of Omega-3 fatty acids, primarily fish which also besides providing Omega-3 fatty acids

can serve to displace some of the saturated fat from the diet. And also emphasizing beans as a main dish. It is a good source of fiber. Again, it can displace sources of saturated fat and cholesterol from the diet. It is relatively inexpensive. And usually, if the beans are purchased in cans, they are easy to prepare and easy to chew.

Now there are some nutrients that are of special concern to the elderly. The first is fat, as I have alluded to. Consistent with the 2000 Dietary Guideline for Americans, choose a diet that is low in saturated fat and cholesterol, an moderate and total fat, the general dietary pattern should be less than 30 percent of calories as fat and less than 10 percent saturated fat.

Does that mean that most elders have to go through those calculations? Probably not. The issue is if they heed the advice of using low fat and reduced fat dairy products and limiting the portion size and choosing lean cuts of meat, then that should not be an issue.

And the elderly are responsive to dietary modification. And they are as responsive to younger individuals. So concerns about whether they do respond to limits in saturated fat intake are probably not of concern.

Getting to the point of should saturated fat be restricted in the elderly, keep in mind that 84 percent of cardiovascular deaths occur in people over the age of 65, and

that about four million Americans over the age of 65 who are discharged from the hospital with a short term stay were diagnosed as having cardiovascular disease. And 72 percent of people with stroke are aged 65 or greater, and accounts for 88 percent of the deaths from stroke. So it is really an issue that should be considered.

Again consistent with the 2000 Dietary Guidelines, choose beverages and foods that limit sugar intake. Here the real issue has to do with nutrient dilution. Again, if you have got decreased caloric intake and you need to meet the same nutrient intake patterns, then there should be some thought given to limiting the intake of refined sugar.

With respect to fiber, fiber is contained in a lot of food groups. We tended previously to not have really emphasized that. However, older individuals do have a problem. And food choices should be specifically selected to contribute fiber. So this would mean emphasizing whole fruits and vegetables in place of juice, legumes in place of meat at least once or twice a week, whole grain products in place of white products.

And again, I think that whole grain products that used to be difficult to obtain in general or used to be more expensive and now more available with the increased emphasis on consumption of whole grain products.

Fluids are also a factor that needs to be concerned

about with the elderly. There are a number of factors that affect fluid balance in the elderly and fluid needs. And that is physical activity levels. Physical activity, medications, and renal function. Ambient temperatures are particularly of concern, especially with older individuals when there is a heat wave, and they are not necessarily the ones who have access to air-conditioning.

The reason that it is more of a concern in older individuals as opposed to younger individuals is that there is a diminished homeostatic mechanism with respect to sensing the degree of hydration of the body. So there is a decreased thirst sensation. So it is important to ensure that elders get an adequate fluid intake. And in the hot summer months, if they are not in an air conditioned place, that they actually think of it. Now we are talking about the independently living elderly. So we are not talking about someone who is being supervised and being monitored, but people who are living on their own. That they need to be told to remember to drink fluid, because they can become hydrated.

Supplements are always a controversial issue with respect to all of us, very specifically elderly. There are some potential nutrients that are of potential concern in the elderly. And that is calcium, Vitamin D and B-12. But in general, most of the nutrients, really the aim should be for the major source of nutrients to come from diet.

Interestingly, if you look at the pattern of supplement users in the United States, they currently tend to be older females that are highly educate that actually consume a better diet than average. So the individuals, especially the older individuals that use supplements, tend to be the ones that least need it.

There is a lot of concern about encouraging supplement use in the elderly just as a blanket statement. Or to sort of quote one ad, that it is an insurance policy. Because we really do not know what happens when an older person says, "Okay, I do not need to be concerned about my nutrient intake, I can eat whatever I want because I am taking a vitamin pill." Since there are a lot of nutrients that are not obviously contained in vitamin pills like fiber and like phytonutrients that we do not really know that much about.

With respect to calcium, again calcium is an issue. The calcium requirement can be achieved by consuming three servings of calcium rich dairy products. There are calcium fortified juices now that can also contribute calcium, although keeping in mind that Vitamin D is not included with those fruit juices. So the benefit with respect to the absorption of calcium is not known.

With respect to Vitamin D again, it should be determined if milk is not used routinely, or older individuals are not consuming a cereal that is actually fortified with

Vitamin D, and sun exposure is limited. With respect to Vitamin B-12, and Dr. Rosenberg alluded to this, there is a higher proportion of atrophic gastritis in older individuals. At age 60, it is estimated to affect 10 to 30 percent, and it goes up from there. It results in decreased bioavailability of B-12. And also because of the lower acidity in the upper GI tract, it can promote bacterial overgrowth which then can use the B-12, so that even less of it is available. And again, the breakfast cereals that are highly fortified usually include B-12.

A summary of the dietary considerations for the elderly is greater emphasis on nutrient dense foods, high fiber foods, and fluid intake. And assuring adequate intakes of calcium, Vitamin D, and B-12. And encouraging the maintenance of sound dietary practices. And also, to really continue to encourage sort of the enjoyment of food, and not just that they should eat this because of this and that because of that. But that they should enjoy eating food, and hopefully be in an environment where that will actually occur.

You are all aware of the Food Guide Pyramid. And as you may know, we took a stab at Tufts of sort of modifying the pyramid a little bit, with specific emphasis on older healthy individuals by narrowing it, just going down to the lower level of recommended intake. Emphasizing low fat dairy products, and emphasizing poultry and fish, dark vegetables, dark fruits, and

whole grain. And also, this should really read fluid equivalence. And that is what the current version reads.

It is not necessarily that all of these glasses of fluid need to be consumed, but just that they do have to be concerned about fluids intake. A lot of fluid can come from fruits and vegetables. And depending on what the choice of dairy products, if it is milk. But just that there needs to be some concern with respect to fluid intake in the elderly. And also, we inserted little Fs for fiber, indicating that fiber can come from a lot of different sources. But especially for the elderly, one really needs to think about it, because they are not consuming enough fiber.

And lastly, if anyone is interested in some of the specifics, here are two Web sites that you can add to the list of Web sites that other people have given you that detail some of what I have discussed. Thank you very much.

(Applause.)

MS. PARADIS: Thank you very much, Dr. Lichtenstein. That was fascinating.

Now we are going to move right along, and have about 15 minutes of Q and A. And Dr. Anand is going to do that. And then we are going to ask Dr. Rosenberg at about 4:00 to do a real quick wrap-up, and then send him on his way, so he can try and catch a 5:00 flight back up to Boston. And Shirley will close with a few summary remarks. So Raj.

MR. ANAND: Thank you, Julie.

I think that you will all agree with me that we have had an excellent quality of speakers. I would just like you to give a big round of applause.

(Applause.)

MR. ANAND: In your packet, we have Facts About Aging, and also some other handouts, Facts About the Dietary Guidelines. We also have them in bigger form, people who may have trouble reading these, if you are in that age group. So we have actually outside them in bigger forms. So if anybody wants, they are available.

People who have asked for credit for attending this, continuing education credit, they should get the forms outside in the reception area. Unfortunately, we have run out of the forms for the American Association of Family and Consumer Services. So if you are looking for continuing education credit from this Association, please leave your name and fax number, and we will send you a form. So make sure that you do leave your phone number.

Now this is your chance to come to the microphones, if you want to make a comment or ask any questions. But do identify yourself before you comment or ask questions.

MS. AGUILLAR: My name is Louise Aguillar, and I am a dietary technician.

MR. ANAND: Excuse me. Could we ask the speakers to

come back here, please. We have to have someone to answer the questions. Dr. Rosenberg. Please go ahead.

MS. AGUILLAR: I have wondered for a long time why other dairy products were not fortified with Vitamin D, like the yogurts and things. And I just wonder if anyone is looking into doing that or where it stands.

MS. LICHTENSTEIN: I would think that would be a question for someone in the USDA. My understanding is that originally there was concern about Vitamin D toxicity. And it was felt that as opposed to having the addition of Vitamin D to a variety of products willy-nilly, especially some that could potentially be over-consumed by children, there were some restrictions on it.

DR. ROSENBERG: In fact, when Vitamin D fortification of milk was begun, it was also tried at roughly the same time in the U.K. And there was a problem with standardization of the amount. And there were some hypercalcemia and toxicity with children. And they stopped, and they never returned.

And so I think that it never moved on to the next step of fortification of dairy products. Europe is also much more conservative about tampering with their foods than we are.

MR. HERRARD: Again, my name is Vladamir Herrard. And I am the editor of the Aging Newsletter. I just had a question I guess for Dr. Lichtenstein or anyone else on the panel about food safety so to speak.

Does the fact that RGBH, the hormone that is found in a lot of types of milk, all affect senior citizens at all at any rate? I know that since a lot of seniors are sort of in a degenerate state, that maybe the hormones might not mean anything. But I was sort of wondering about that, aside from Vitamin D toxicity, if hormones at all play a role.

MS. LICHTENSTEIN: I am not aware of any data to suggest that is a risk in the elderly or anyone else.

MR. ANAND: Go ahead.

MS. BONKER: I am Joyce Bonker from Howard University. I would like to know which came first, the chicken or the egg, in terms of loss of muscle mass or decreased ability to use calories. So I am understanding that as we age, that we lose muscle mass. We also gain the marbling of fat in the tissue. We also lose appetite.

So what did come first, is there some kind of mechanism that triggers, that says hey, let's lose some muscle mass, tell me?

DR. ROSENBERG: That is a very perceptive question, and one for which there really is not a consensus answer. Let me just try a couple of things. First of all, yes, you can say that if there is a decrease in physical activity and a decrease in muscle mass with age, that those will add up to a decreased appetite drive based on an energy requirement.

But there are those that would argue that is getting

the chicken and the egg wrong. And that there are in fact age related phenomena that are perhaps driven by changes in taste, and perhaps driven by regulation of dietary intake needs, different ways of expressing appetite, which actually are part of aging, and then are followed by decreasing intakes which then have the other effects.

I do not think that we are in the position to say that it is one or the other. It may very well be that both phenomena are operating.

MR. ANAND: Jay.

MR. HIRSCHMAN: Jay Hirschman with the Food and Nutrition Service. I would like the panel in general to address the question of nutrition interventions for the elderly that might address the longevity disparity between women and men.

MS. LICHTENSTEIN: I can certainly say from the perspective of cardiovascular disease -- and if you have not guessed, that is my area of research -- that women have about ten years of protection longer than males, or it is offset by ten years. And that is generally thought to be do with the protection conferred by estrogen. That RDL levels in pre-menopausal women are relatively low. And it is when they lose the estrogen, it does up. And then their risks starts becoming similar to males, but it sort of occurs parallel.

Since that is the leading cause of death in

Americans, that probably accounts for some of it. I cannot comment on other factors. It may be a lot of it.

MR. ANAND: Dr. Rosenberg.

DR. ROSENBERG: Well, we were talking about this at lunch. Because cardiovascular disease dominates the mortality statistics, and there is that protective effect of estrogen, that certainly is going to be a factor. Now there are some unfortunate trends, which are going to mediate somewhat those differences. We have not yet seen all of the impact of smoking in women not only in cardiovascular disease, but also on lung cancer.

So some of these other effects are going to, I think, play out as we look at the cohort effects beyond. We could not decide at lunch whether the females of the species are truly biologically superior. But with respect to estrogen and heart disease, that certainly seems to be the case.

MR. ANAND: Ms. Hall.

MS. HALL: Judith Hall from USDA. I would just like to say a little bit about that last question. Certainly, looking at the Baltimore longitudinal study of aging, and this is sort of a lead group, it appears that women make better choices than men in that they eat more fruits and vegetables. If you look at their Vitamin A sources, it is more from fruits and vegetables, whereas men have more Vitamin A coming from meat sources. The protein breakdown of men and women is pretty

rock solid at about 15 or 16 percent across the age span in both men and women, but the sources are different in women than they are in men.

I do not know if this is physiological, cultural, or why there are appetite differences, but the breakdown of the diet is different.

DR. ROSENBERG: Is there any evidence of a cohort effect there, Judy, are those differences changing in any way over the 20 years of the study?

MS. HALL: It is 40 years.

DR. ROSENBERG: The 40 years.

MS. HALL: Well, as both men and women get older, they do eat more fiber, less fat, and less meat. So the disparity is changing or it is not.

DR. ROSENBERG: The new ones that are coming in have the same differences?

MS. HALL: No, they are closer together. The men and the women are closer. The younger men and women are closer together than older men and women. So I think that the disparity may be decreasing.

But I have two quick questions about the folate. As the parent of a person with a neuro tube defect, I am wondering if there is evidence that this fortification has had an effect on neuro tube defects. And also, if the fears that this fortification was going to mask Vitamin B-12 deficiency, if

there is any evidence as to that?

DR. ROSENBERG: To my disappointment, the systems for surveillance that really needed to be set up by the CDC to monitor the effects of the folate fortification have been slow in coming. There are some surveillance programs going on in different states. We keep being told that there is going to be some report of those, but I have not seen any of that data. There is the problem of interrupted pregnancies that makes that a little bit more difficult.

By the same token, there has been on surveillance systems to look at the effects on Vitamin B-12. There are those who suggest that from the start perhaps that we should have added B-12 to the folate. If we add too much, it is going to make break a little pink. But I think that we should be getting some of the data.

And, of course, one can now start adding other arguments for the folate in B-12 fortification. I think that the conservatism, if you will, about the dose of folate to put into flour had to do with the fact that you are dealing with a very large population at risk, an increasing population in the elderly with borderline B-12 status.

MR. ANAND: Go ahead.

MS. FORMAN: I have three very brief items. I am Paula Forman from the Securities and Exchange Commission. And among other things, I am the elder care coordinator. And I

would like to say first of all that I really appreciate all of this information that has been given to us today.

And I have a suggestion, I have spoken to you and some other people about it. To get this information as much as possible posted on the Web as soon as possible. If you all have Web sites at your universities and personal organizations and you could post it, and they can just put up hyper-links and we can get right to it by just coming to the USDA place on the Web already advertising this and talking about this symposium.

So it would be wonderful, and the sooner the better. Because while it is fresh in your mind and while you want to check your facts. And if you do not have all of your charts and everything ready, just put it up without charts, and say charts are coming later, and get the information back there. It would be greatly appreciated.

I did have one brief question, and it is a chicken or egg question. I have heard all of my life about how elderly people fall and break their hips. And one time, somewhere I heard that what happens is that the hip breaks and the person falls. I would like to know if there is some kind of an answer to that.

MR. ANAND: Your first suggestion, actually consider it as done.

DR. ROSENBERG: I think that the overwhelming evidence -- and Connie, you may have some data on this -- but

the overwhelming evidence is that falls precede fracture. In fact, many of us think that is one of the strong reasons for recommending exercise. Because in fact, you can prevent falls. And there has been evidence of this by strengthening the muscles in the lower legs, which not only make the legs stronger, but also improve balance. And imbalance leads to falls.

Certainly, there are going to be some cases when pathological fracture occurs without a fall. That is clear. And in those cases, there may be a fall followed by fracture.

MS. LICHTENSTEIN: It is also something that is very difficult to assess. It almost seems like we should be able to do that. But obviously, it is not something that you can measure directly.

MS. BALES: I would agree. And also, I just heard of some new data, and I do not remember the source, that said that people who do not fall can walk around with pretty low bone densities, and not necessarily have that fracture. So I would agree with what Irv was saying. That doing things both in terms of exercise, but also good lighting, handrails, and things like that that prevent falls can really reduce fracture rate.

MR. ANAND: The last question.

MS. BONKER: I am back again. I am still interested in that thigh muscle. My concern is a training effect. In

doing a physical activity, i.e. racquetball, handball, badminton, when a person is in their twenties and they put the muscles through an extensive work-out and get a little sore and start the training program, within a week or so they can exercise and do this activity with impunity without concurrent muscle soreness.

As we, or they, or us, as we age, it appears as though the muscles do not want to cooperate. They do not recover in terms of a training effect. The soreness lasts longer. It takes longer for them to get in shape. It is easier for them to break a training routine.

Can that be explained by the increased fat within that muscle or what?

DR. ROSENBERG: I do not know whether it is the increased fat. You know, the phenomenon that you are describing is correct. One of the characteristics of aging is a diminution in adaptiveness, whether it is due to new exercise, whether it is to a change in diet, whether it is due to a change in chrono-biology. So the phenomenon you describe is correct. I doubt frankly that it has to do with the fat in the muscle. I think that it has to do with less muscle, and I think that it has to do with the innervation, the nervous innervation of muscle, which also has a part to play in the loss of at least Type II fibers.

What is interesting is that there are some studies

that indicate that if you compare exercise in young and older individuals, that the response to exercise, the inflammatory response to exercise which gives rise to some of the pain that you talk about, is just as bad in the older people as in the younger people, but it takes sort of longer to heal. And it may in fact, and this is one of the few instances that I have seen some interesting observations about Vitamin E as an antioxidant, that in fact that inflammatory response in elders may be more responsive to an anti-inflammatory vitamin.

MS. LICHTENSTEIN: Something we did not touch on in lifestyle that we really should be talking about. The one part of the equation is nutrition, and the other is physical activity, and maintaining physical activity in older individuals. And you hear about the data that physical training and strength training will be beneficial. But just encouraging older individuals to maintain a certain level of physical activity and provide opportunities for them to be able to do that, whether it be to find companions to walk with or safe places to walk, or a certain type of exercise equipment under supervision. But it is probably just as important to keep people physically active as to optimize their nutrient status.

MR. ANAND: A last brief question.

MS. YOUNG: I am Katie Young, and I am a dietician. My question was briefly alluded to, and at this point I do not

remember by whom.

In all of these wonderful Web sites that you guys have, is anybody collecting data on the incidence of alcoholism, and what effect that has, especially as women who are widows get older, is alcoholism really a big problem with these older people or not?

MS. LICHTENSTEIN: Maybe Raj can tell us the name of the agency who is doing that.

MR. ANAND: I do not know.

MS. YOUNG: In the Bible Belt, we do not have any. In the Bible Belt, nobody drinks. They say I do not drink, whether they do or not.

MS. LICHTENSTEIN: I believe that it is in within FDA. There is someone who is actually monitoring alcohol intake, and it did come up with the discussions on the Dietary Guidelines for alcohol.

MR. ANAND: Okay. Now I would like to ask Dr. Rosenberg to look into his crystal ball, and see what is in the future.

DR. ROSENBERG: I suppose that what qualifies me for the ability to predict the future is that I have more gray hair than any of the other members of the panel or speakers. Although I did make a statement about wisdom and gray hair, I am not sure that it applies in each case.

But I would like to make just a few points. We are

experiencing one of the most important sets of revolutionary change in the history of mankind. We are not only experiencing this extraordinary information resolution, but we are experiencing a demographic transition which is really unprecedented in the history of mankind.

This kind of information in the U.S., which over the course of this century, we have gone from one in 25 of the population over 65 to now one in seven or eight in the population, and soon to be one in five of the population. It is an expression of what this mountain of people in older age groups that you see on this slide is a worldwide phenomenon, and not just in the industrialized world, but in the entire world.

And I can tell you in the recent past that I have been in meetings representing health experts from developing nations. This is a phenomenon that exists even in those nations where the priorities between those that focused almost exclusively on maternal and child nutrition problems to those that have to start taking into account issues of chronic disease including obesity, and diabetes, and cardiovascular disease is truly a worldwide phenomenon. It is a huge challenge.

The expectation is that there will be a billion people over the age of 60 in the middle of this current century, a billion people in the world. And that is going to

represent a challenge with respect to management, and health care, and health care costs and so forth that is almost unimaginable, and certainly unprecedented.

Now in the next slide, could I have that next slide or the one before that, or I guess the one after it then, if we are experiencing these kinds of declines in function, then it is going to be terribly important not to have a world population or a national population with significant declines with very large numbers of disabled individuals and people with chronic degenerative disease.

So I suggest to you, if we go back one slide, that this needs to be our motto. In a sense, it is the guiding principle for the USDA Human Nutrition Research Center on aging. That is what we have to achieve as a goal. And interestingly enough, this rectangularization of the curve, as it has been called, is actually occurring. And you can actually show that there is from the work of the demographers, there is increasing longevity or increasing health span, even without very great changes in total age span.

And I would argue, and you can take the slides off, that what the future holds in store for us is that challenge of recognizing that we are in a revolution change in demographics, changing the focus not only in this country but around the world of what are the health priorities. And that imposes an obligatory need for preventive practices and services that I

think that we already have good evidence that it is likely to be cost effective and cost saving, and maybe even absolutely required from the standpoint of economic considerations in terms of the potential for health care needs of a population with a high degree of degenerative disease.

And I think that the investment that we are making now in trying to understand what are the relationships between our habits, our diets, our physical activity, and some of these biological changes which occur with aging is an enormously important and I would argue very cost effective investment. And perhaps the challenge now is not only whether to continue that investment to understand these relationships, but also to improve on our techniques of the translation of the information that we have to the public, to policy making bodies, and incorporating these things in the way in which we discuss with Congress on our priorities for health care expenditure and research expenditure.

And the good news is that we are making progress. The good news is that we are understanding these relationships. The good news is that we can identify increasingly ways in which we can modify what was once considered an inevitable progression to frailty.

The notion that betting beyond 60 or 65 will result in frailty, that is behind us. We have also undergone a revolution in our thinking about healthy aging. And I think

that we need now to recognize that for the good of the country and for the good of both those elderly who are growing older, that there are children who are faced with care responsibilities, and grandchildren who are faced with the financial responsibilities of all of that care, and we have a great challenge and a good reason to move forward on this with very high priority.

And I think that you have seen that my colleagues on this panel that we are making progress on the science. And I want to say that I really do appreciate the activities of the Food and Nutrition Service in identifying this as something that they really wish to highlight as we go forward. Thank you.

(Applause.)

MR. ANAND: The last word of wisdom from the Under Secretary.

MS. WATKINS: Let me thank all of you, the speakers, for being here with us today. And for those of you who sought fit to plan your special day around the symposium, we are indeed grateful. I just want to give you one or two last comments, and thank the staff for all of their hard work, and Dr. Anand. I would just like for all of the C&PP staff to stand up, so you can recognize the people who are actually putting all of this together.

(Applause.)

MS. WATKINS: They constantly remind me that they have a very small staff. And I said well, you know, a little piece of leather is well put together. And it does not take a lot of money to get a lot of things done. And they keep telling me that is not the case. But they do an incredible amount of work with the small staff that they have, and we are indeed grateful to them for all that they do.

The next symposium, you may want to put it on your calendar, is December 6th, Diet and Genes. It should be a very provocative discussion, and we look forward to having you come back and join us for that very special day.

At a point today, we had an opportunity to ask our speakers what do you think we should do with all of the information that you provided us, and where should we go next, and what should we do. And I think clearly they have enumerated a lot of things that we can do. And we are going to begin putting some of those things in place.

It is interesting that one of the questions that was raised was the stove piping at the Department of Agriculture, and the lack of being able to get around that. And I agree that is true. And any of you who have ever heard the Secretary speak, he has always said that there is one four letter word that he does not expect to have at the Department of Agriculture, and that is turf.

And when we can eliminated turf, get rid of that, and

focus on how do we take the research that we have today and what we know today, and use that research information to make policy decisions, that will be I think a legacy that this Secretary would have left with us.

We are going to see if we cannot put some things together that will address that. And with the presenters that we have had today and some that we have had in the past, pulling those people together and saying how can we get this done and how can we ensure that our policies reflect the research.

I think that we are far past the days when research is done and completed, and presented, and bound, and put on a shelf. It is time that we take that valuable information and use it for making good policy decisions. Julie and I have had tried to do that since we have been here. And every time that someone comes in with a study, our first question is, and Jay is laughing, what are we going to do with it, how are we going to use it, and how are we going to market it, how do we implement that into policy.

And that is what we hope we will be able to do. I know that the Secretary has written Raj a note, and I do not need to know what it is. I think that I can already say that he is going to ask us tomorrow, and what are we going to do with what we heard, and how can we expand on what we have heard today.

And I think that is why we exist. And I think that you are going to see some exciting things come out of this, just as you did in our first symposium on Childhood Obesity Prevention. We are very excited about the work that is going on around this country in childhood obesity prevention from legislation to changes to how we react to certain information in our programs to the Dietary Guidelines having added exercise, which we probably thought would never get there.

But to have that place in the Dietary Guidelines, and today know that is being sent out. And hopefully everyone around this country will know what the Dietary Guidelines are, and we can see some positive changes taking place in 2010 when we evaluate the health objectives of this nation.

This has been an exciting day for us. We appreciate you all being here. We look forward to putting some of these things into practice in our policies. And our friends who are here from other federal agencies, we would like to also thank you. There are a lot of people here from USDA agencies that interface with us. It is that strong partnership that will make all of this happen.

Thank you very much. And we look forward to seeing you on December 6th, as we talk about diet and genes.

(Applause.)

MR. ANAND: Thank you.

(Whereupon, at 4:15 p.m., the symposium was

concluded.)

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