Interest Group 10: Ageism in the Era of Inclusion and Diversity (Perfected Transcript)

Walter Frontera: Good morning, everyone. It is 11:15 and we are going to start with the program for today. It is my pleasure to welcome all of you to the annual session of the Interest Group No. 10, Biology of Aging/Geriatrics of the National Academy of Medicine.

My name is Walter Frontera and I'm the Chair of the planning committee for this session. I would also like to recognize the other members of the planning committee: Judy Salerno from the New York Academy of Medicine, Elissa Epel from the University of California, San Francisco, and Mary Tinetti from Yale University.

The main topic for today is ageism in the era of inclusion and diversity. We have invited two fantastic speakers to make a 20-minute presentation each. The presentations will be followed by a reaction by two experts in the area. We will also have an open discussion with questions and answers after each presentation and reaction.

Now, before we proceed with the program, we would like to invite the President of the National Academy of Medicine to say a few words.

Victor Dzau: Thank you, Walter, and Judy, good morning to all of you. For those who are actually joining us from maybe Europe, Japan, Asia, I say good evening and good afternoon.

I invited myself to you, but Walter's very nice to say, sure, come and speak to us, because this is such an important topic. I think you all know that this the first grand challenge for National Academy of Medicine: healthy aging. And, of course, our second grand challenge you'll hear some more of at this meeting is climate change.

You can see that our members have chosen very judiciously about what are the big, big issues that face our society. What are the big issues that face, in fact, our nation, and of course our population; and that's aging. But I think you guys can talk about such an important issue because of the entire social and environmental impact on aging.

But we've been thinking about a lot of causes. How to enable the population, which clearly is getting older but healthier, how do you in fact enable a healthy longevity? I believe you would agree that overall lifespan is being achieved, an extended lifespan, in almost everywhere in the world. However, to have a population that is productive, that is engaging, that has good quality of life, we need health. That's why our emphasis is on health and longevity and, of course, ageism, issues of discrimination, issues of equity all come up as an important determinant of health.

So let me just say a word about what in fact is the grand challenge for those who are not familiar with us. The NAM recognized healthy longevity as its first Grand Challenge ever, the first Grand Challenge back about 5 years ago. We held an annual meeting, which the topic of aging was discussed extensively. I had one of the first Presidents Forum, which we picked on this topic, and we had a variety of people joining us from social scientists, to engineers, to biomedical scientists, to in fact, even the private sector and others—those who are involved with finding new innovations to help health longevity. At the end of

this, it became very clear that there is in fact a really important need to create a momentum around healthy aging; hence we launched the Grand Challenge.

There are two components of the Grand Challenge. One is what we call a roadmap. A roadmap as you know, in the Academy's terms is really an extensive consensus report that maps out where we need to be—our society, our nation, the world—in order to achieve health for everyone who ages. That is a map that addresses social economic enablers, health and health care, and science and innovation.

All told, the idea is to influence practice and policy. So, this roadmap as an international commission co-chaired by Linda Fried of Columbia and John Wong of Singapore. And there's truly an international commission of members from different parts of the world, almost all continents, to discuss this global issue. They are well on their way to, now, in the last stages of putting together this report, which is extensive, that actually looks at not only issues of science, issues of innovation, issues of health care, but importantly, social issues.

We look at equity in a big way. We all know that during COVID, it shines a light on this vulnerable population, in order to not have a high mortality rate of the older population when achieving COVID, but in fact they need to be healthier. We also look at the economic impact, both economics for the older population as well as economics for society, making a strong case for investment.

I think this is very exciting. The report will be released early next year, probably in about February, no later than March. We have a very extensive dissemination strategy to bring it to different parts of the world, engaging both policymakers as well as community workers to practice the issue of health longevity, working closely with UN on decades of aging and, of course, many other organizations on this.

The second part of the Grand Challenge is actually creating more innovation, what we call global competition. We've created a global competition that's unparalleled. We've been able to engage over 50 some countries and regions, actually sponsored by, funded by eight or more funding agencies from China, Japan, Singapore, United Kingdom, European Union, United States, and so on, so forth. Recently we have been joined by Chile, and Canada, and Hong Kong. It's becoming really extensive.

Our first round is just to say, let's give out $50,000 seed money. This was, by the way, the brainchild of the late Tachi Yamada, who I miss greatly. He had brought it from the Gates Foundation experience of the Grand Challenge Exploration, giving us seed money for innovators just to start exploring the idea. We made the application very simple, a two-pager. No preliminary data necessary, no feasibility data.

We tried to pick what's really bold and what's really game changing, and we covered all the sciences from biomedical, to engineering, digital sciences, social sciences, and everywhere, as long as we meet the goal of improving physical, mental health, well-being, quality of life of people as they age, not restricted to only to over 65 because we all realize it's a whole life cycle and health span.

And so, of 1,500 applicants globally, we selected 150. We have given 1 year of such support. And we just had a global innovation summit we'll announce in the next set. But, four of the first-round winners got the next level of support, called Accelerator Award of $750,000 to help them move it forward. This is supported by J&J Innovation. We also have the opportunity to put five forward to European Investment Bank, which will give them also the same level, if not even more, to enable some of these ideas to move forward. The idea is to take, you know, innovation towards application.

I think this will certainly create, in my opinion, a market for opportunities but making sure that this is equitable access for everyone.

I'm going to stop here just to say I'm so enthusiastic about what you're doing, and today's topic is so relevant. I just want to come by and say hello and answer any questions.

Back to your Walter and Judy.

Walter Frontera: Thank you very much, Victor, for this great introduction and for highlighting the importance of healthy longevity.

We're going to continue with the program. We're going to invite Nikita Varman from the NAM staff to give us an update on the activities of NAM and aging. Nikita?

Nikita Varman: Good morning, everyone, my name is Nikita Varman, and I'm a research associate HMD's Board on Healthcare Services. Thank you so much for having me today. I will be providing you all with a brief update on HMD's recent and current projects that may be a particular interest to this group, especially as related to aging.

To begin, several prominent studies have been released this past year, a few of which are listed on the screen before you. In May, we put out two consensus studies. One that examines how to strengthen primary care service in the United States, especially for underserved populations and to inform primary care person systems around the world. And two, a study to extend the vision and charter the path for the nursing profession to advance the health and well-being of the US population, reduce health disparities, and create a culture of health.

In July, the Division of Behavioral and Social Sciences and Education, abbreviated to DBASSE, released a detailed study on the impact of dementia in the United States. This study focused on developing a research agenda for the next decade in the behavioral and social sciences as it relates to Alzheimer's disease and Alzheimer's disease–related dementias. It also assessed the role of the social and behavioral sciences in reducing the burden of dementia.

In April, three forums worked together to release the proceedings of a workshop held in January this year, called Improving the Evidence Base for Treatment Decision Making for Older Adults with Cancer. Sponsored by the Food and Drug Administration, this workshop series examined the root causes that limit enrollment of older adults in cancer clinical trials and strategies for improved inclusion of older adults across the drug-development continuum.

Now I want to draw your attention to some of our ongoing work at the Academies. Victor went into great detail about the NAM Healthy Longevity Global Grand Challenge, again, a worldwide movement to improve the physical, mental, and social well-being for people as they age. To reiterate, the project is broken up into those two parts, the global competition, which awards prizes to innovators, and the roadmap, which is an evidence-based report released by the committee.

In regards to the competition, the competition recently held their inaugural Global Innovator Summit and also made a number of new seed-funding awards. A number of second-level awards were also made, and new countries and regions are coming on board to join the competition in 2022.

A second ongoing project right now is a consensus study that brings together 17 experts to address the quality of care in nursing homes. As a research associate on the study, I can tell you that we had a series of public webinars earlier this year and just held our fifth committee meeting. The project has an expected release date in early 2022.

I, of course, have to give a shout out to Terry Fulmer with the John A. Hartford Foundation. I thank her for being our primary funder and the impetus for making this study happen. I also want to think our other sponsors: The Commonwealth Fund, the Jewish Healthcare Foundation, the Sephardic Foundation on Aging, and the Fan Fox and Leslie R. Samuels.

Continuing the conversation of ongoing work, we also have two roundtables and forums of particular interests that have both been active over the past year. As you can see on the screen before you, the Forum on Aging, Disability, and Independence held a July webinar series on COVID-19 disaster preparedness and vulnerable populations. In collaboration with the Forum On Medical And Public Health Preparedness For Disasters And Emergencies, we held a roundtable on the promotion of health equity. In August, the forum released a NAM perspectives piece is under Protecting the Medically Vulnerable Amid COVID-19.

The roundtable on the right side of the screen has also held a number of workshops over the past year, including one on serious illness, structural racism, and health disparities during COVID. Another on caring for people with serious illnesses at home during COVID, and a third on integrating serious illness into primary care. All of the roundtable and forum work I just mentioned are available and archived on our website.

The roundtable and forum both also have a few upcoming events. From December 1st to 3rd, the forum is hosting a collaborative workshop with the National Cancer Policy Forum on the role of companion animals, and on December 8th, a webinar on social isolation and loneliness at the end of life in COVID. In November, the roundtable is hosting a webinar series on the impact of and response to the pandemic for people with serious illnesses.

And finally, we have two new and upcoming exciting projects I want to highlight quickly. We have an upcoming workshop on the mechanisms for organizational behavior change to address needs for people with dementia. This is a collaboration between HMD and the Division of Behavioral and Social Science and Education. We also have an upcoming consensus study on transforming health care to adopt a full health strategy.

Thank you so much again for having me and for allowing me to share a few highlights of our recent, ongoing, and upcoming work. Again, you can find all kinds of information and archive presentations on our website. If you have any questions, please don't hesitate to let me know. Thank you.

Walter Frontera: Thank you very much, Nikita. I hope that the members will take advantage of all the activities that are being done by NAM in this particular area.

Now we're going to get started with the first part of our discussion today, of our program today, and I'd like to then ask our moderator, Elissa Epel, who is a member of the planning committee, to take it from here. Elissa?

Elissa Epel: Thank you so much, Walter. It's been a pleasure to be on the committee with you and Judy and Mary. This is a very exciting format where we really built-in audience participation. So, this is going to be very interactive.

I'd first like to introduce our first speaker, Becca Levy. So, Becca, welcome.

Becca is an associate professor in the School of Public Health and Psychology at Yale University. Her research explores the psychosocial factors that influence older individuals' cognitive and physical functioning and their longevity. It is easy to say that she is the pioneer in creating the field that focuses on how positive and negative stereotypes, which are assimilated from culture, can have both beneficial and adverse effects on health and longevity. She has done the hard work of bringing this very robust field to dissemination, working with AARP. She has also done the, I will say, brave but important step of disseminating this by writing a book for the public on this amazing body of research called *Breaking the Code: How Age Beliefs Impact How Long and How Well You Live*, so that should be coming out this Spring. She's received many awards for her work, too many to name. I'll just name one, the Baltes Distinguished Research Achievement Award from the APA. She does tremendous service to our field, on top of all this, serving on the editorial board of journals, and being the editor of the *Handbook of Psychology and Aging*, and one of the founding editorial board members of *Stigma and Health*.

Welcome, Becca, thank you.

Becca Levy: Thank you so much, Elissa, for that very kind introduction. Thank you for inviting me to speak today. It's a real honor and pleasure. I'll go ahead and I will share my screen. Thank you again for inviting me to talk with you today on this very important topic of ageism in the era of inclusion diversity. It's a very timely topic.

As you likely know, ageism is very widespread in our country today. In a recent study conducted by the University of Michigan, 82% of older persons reported experiencing ageism in their everyday life. In another study, it was found that two-thirds of workers reported witnessing or experiencing ageism. Yet, unfortunately, inclusion and diversity efforts fighting prejudice and stereotypes rarely include age or overcoming ageism. There are some important exceptions, including the efforts of the National Institute on Aging, which we're going to hear about later today.

Just to give you two examples of how I think age has largely been excluded from inclusion and diversity efforts. In the workplace, we know from a recent AARP study conducted in 36 countries that most workplaces that have diversity and equity programs exclude age. A social media example comes from a study that we did on how age stereotypes are portrayed on Facebook. We found looking at publicly accessible Facebook groups that focus on older persons, that most include negative age stereotypes of older persons, 37% ban older persons from public activities such as shopping, and some even advocated killing older persons. Yet, the Facebook Community Standards exclude age from the 10 groups that are

protected from hate speech. I should mention it used to be that age was not included at all, but recently they added a phrase that said age is protected if it is in conjunction with another group that is protected. In other words, Facebook does not feel that age alone is worthy of protection from hate speech.

Unfortunately, during the pandemic ageism has been increasing. There are many reports, both in United States and in other countries. There was a Twitter analysis that found in early days, there was 1.4 million sharing and liking of the term “Boomer remover,” which mocks the idea of older people dying from COVID.

There are also numerous examples of structural ageism during the pandemic. For example, in the early days of the pandemic, we know that 40% of the deaths took place in nursing homes and long-term care facilities. One of the reasons for that was that there was not, the government did not provide personal protective equipment to the workers and the residents of these facilities.

What I'd like to do in my remaining time is argue that the Stereotype Embodiment Framework can be useful to reduce ageism and improve older persons’ health. What I'd like to do is briefly go over what that framework is, then I'd like to talk about the breadth and the depth of the impact of ageism on health. Lastly, I'd like to talk about ways that we could perhaps combat ageism and its impact on health.

So, starting with the framework. When I started this research, this research that was being conducted on stereotypes—age stereotypes—focused on young people, how they impacted the thoughts and behaviors of young people. I felt that it was important to include older people in this research and actually look at how these stereotypes may be impacting older persons themselves. I developed a framework to think about what the process may be, called Stereotype Embodiment Theory Framework. It's the idea that age stereotypes are embodied when they're internalized from the culture that can lead to self-definitions that influence older persons’ health. This framework is a way to understand the growing number of studies and also make predictions and go forward with this research.

There are four processes, which this framework outlines, by which these age stereotypes that exists in the culture can get under our skin or impact health. The first process is that they become internalized across the lifespan. We know from numerous studies conducted with children that children as young as 3 have already taken in most of the age stereotypes of their culture.

The second process is that they can operate unconsciously. We know from our research that they can operate without people's awareness. What's perhaps disturbing about that is it's hard to fight off these, the impacts of negative stereotypes if we don't know the impact that they're having on us.

The third is that they gain salience from self-relevance. We have found in our research that they don't impact the health of younger people; it's not until people become older and identify with older age that it starts to impact health.

And lastly, there are multiple pathways by which these age stereotypes can impact our health. The first is psychological. For example, we have found that those people who've taken in more positive age stereotypes tend to have a higher will to live. The second pathway is behavioral. For example, we have found that older persons who have taken in more positive age stereotypes tend to engage in preventive health behaviors such as exercising and eating a healthy diet. The third is physiological. We have found

that those who've taken in more positive age stereotypes tend to have lower stress biomarkers, for example, cortisol.

Now I'd like to talk about the breadth and depth of the impact of ageism on health. We've conducted numerous studies that have looked at a range of outcomes. In these studies, just to give you an overview, we have found that older persons who have taken in more negative age stereotypes tend to have worse cognitive outcomes, including memory performance and dementia incidents. They have worse physical outcomes, including Alzheimer's disease biomarkers such as plaques and tangles, have reduced hearing performance, have elevated cardiovascular events, and have reduced physical function and recovery. We found that it can impact mental health outcomes, including higher stress levels and higher levels of psychiatric disorders. And we have found that it can lead to health behaviors. Lastly, in numerous studies we and others have found that each negative age stereotype is associated with reduced longevity. I'd like to give you three examples from our research that illustrate some of these findings. I'll give you a cognitive example, health behavior example, and a physiological example.

This is the first; this is our cognitive example. In this study, we looked to see whether age stereotypes had an impact on dementia incidence. This was conducted with about 5,000 participants in a health and retirement study. They were all dementia-free at baseline, and then we followed them over 6 years. What we found was that the… And so, the orange are those who started off with more negative age beliefs, and the green bar are those who had started off with more positive age beliefs. And, as you can see, looking at the two bars on the right, those who had positive age beliefs were significantly less likely to develop dementia. What we also found, looking at the two bars to the left, was that even among those who had the high-risk *APOE4* gene, those who had more positive age beliefs were also about half as likely to develop dementia over time. This I think suggests that we could consider age beliefs as potentially a preventive, positive age beliefs are a preventive area to reduce dementia incidence.

I also wanted to share with you a health behavior example. This is from a recent study that we conducted. We were interested in whether negative age stereotypes may contribute to the behavior of older persons rejecting COVID hospitalization.

This was based in part on the finding about excess deaths during the pandemic. As you know, there were many deaths above and beyond those that were attributed to COVID that took place. In 2020 there were 120,000 deaths in the United States that were above what would be expected based on previous death levels but that were not attributed to COVID. I was interested in the idea if, perhaps, they may be in part due to older persons avoiding hospitalization and dying without a diagnosis at home, in part because of negative age stereotypes, which can bring about a sense of futility and also can elevate stress.

We conducted an Internet survey of about 1,500 older persons and we presented different scenarios. One of them was, what should an older person who was severely sick with COVID do; should they be hospitalized to get treated? What we found was, as predicted, those who had more negative age stereotypes were significantly more likely to reject that the older person should get treated in a hospital.

This is a physical example that I'd like to share. This is from a study that looked at whether age stereotypes are associated with cardiovascular events over time. This study, in which Dr Ferrucci was a co-author—He is, as you know, has been very involved in leading the Baltimore Longitudinal Study of Aging, which is what we use for this study. We looked at cardiovascular events, that's in our y-axis, and

then our x-axis, it's the years from baseline they had a cardiovascular event. The blue line is those who started the study with more negative age stereotypes, and the red is those, is the group who started with more positive age stereotypes. As you can see, those who had more negative age stereotypes were significantly likely to develop cardiovascular events.

Something that's notable about this study is that we were able to include a group of younger adults as young as 18 who reported their age beliefs at the beginning of the study. We found that even in this group, age stereotypes they reported at a young age predicted the likelihood of them having a cardiovascular event after they turned 60; so they're about twice as likely to develop a cardiovascular event if they had reported particularly more negative age stereotypes at baseline. I think what this suggests is that if we design prevention efforts, it would be good to start at a young age. Young adults and probably even children would be great to include in any efforts.

Lastly, in talking about the breadth and depth of age stereotypes on health, I wanted to mention a study that I recently conducted with a health economist. The reason that we conducted this study was, I felt that we had been accumulating all these findings about how age stereotypes can impact health, but we have not yet seen a lot of change in policy in addressing the ageism. I thought if we could come up with some financial numbers that maybe that would actually be good evidence for policymakers to go forward and actually make some change in policy.

What we found in this study is we looked at all older persons 60 and over in the United States over 1 year, and we looked at the eight most expensive health conditions. What we found was that the impact of ageism, age stereotypes, negative self-perceptions of aging on health was about $63 billion. This is just to give you some perspective, this is about, it's actually more than we now spend on morbid obesity in the same time period.

Lastly, I would like to talk about combating the impact of ageism on health. One key idea, I think, for thinking about combating ageism is that these age stereotypes are malleable. We know from cross-cultural research that age stereotypes are very different in different countries. We know from our experimental research that we can shift age stereotypes. We also know that age stereotypes change over time. So we did a study examining age stereotypes over about 200 years, and we found that there has been a shift in age stereotypes, but unfortunately they're becoming more negative. I think what the important piece of this is that we can change them. That, I think, suggests that there is room for social change.

I think there's two directions that we could take to combat ageism. One is a bottom-up approach, so to actually give the skills to older persons to become more aware of the positive age stereotypes and to resist the negative age stereotypes. The second is from a top-down perspective, from society to actually change and reduce the number of negative age stereotypes. I think until we achieve that on a societal level, I think both levels are really important to work on.

To give you one example of a bottom-up approach, we conducted an intervention designed to bolster positive age stereotypes and improve physical function. What we did find in the intervention was that we were able to bolster positive age stereotypes and improve physical function over an 8-week period. This graph shows improvement in physical function on the y-axis, and then the purple is those who were in the group that was given the intervention that bolstered positive age stereotypes by exposing them to implicit positive messages about aging and also asking them to write an essay about a positive, active

older person. We found that they did significantly better over time than those in the neutral condition. Something that was interesting about this study was we actually found that the effect grew over time.

In terms of a top-down approach to ageism, one thing that we could do is put in place an anti-ageism tsar that could address structural ageism, and they could actually go to the source of the ageism. For example, two places to start would be the anti-aging industry and social media. The anti-aging industry, in particular, is a multibillion dollar industry that profits from the negative age stereotypes.

We could also promote positive images of aging and reduce negative images of aging in hiring, training, and everyday culture. We could also add age to all diversity, equity, and inclusion programs. Lastly, it would be great to launch a campaign that describes the health impact of negative age stereotypes based on the successful campaigns that have been conducted in the anti-smoking area.

Lastly, I wanted to mention, one campaign that just started this year. The World Health Organization launched a campaign to combat ageism. There were 194 countries that have endorsed the campaign, and I was honored that they included some of our research as their evidence base to go forward. Their goal is to combat ageism, so hopefully we will see some changes soon.

So lastly, I just wanted to mention, these are some of the papers that I talked about in my presentation. If anybody is interested in any of these I'm more than happy to share any of our findings and studies.

I would like to acknowledge the funders of this research, including the generous support of the National Institute on Aging, and the collaborators, that include Dr. Luigi Ferrucci, who have made all of these studies possible. Thank you so much.

Elissa Epel: There's never enough clapping and applause on Zoom; it's always this awkward silence. Becca, that was absolutely amazing. The way that you have grown this field in a short period is really mind blowing. I heard you speak several years ago, and already then I thought, wow, why aren't we doing more, this is so impressive! And you are; you're really implementing this. I'm struck by your methods. You just use so much rigor, and you use population-based, methods, lab-based methods, clinical studies.

All of these studies, I don't know if anyone noticed, they were in the top-quality psych or medical journals. The policy implications are outstanding, so we'll definitely talk more about that.

The strength of the case for health, health care, and economic burden—that last one showing the cost savings is always kind of the linchpin that researchers forget to do and so we have less of a voice or impact; so that was a very important study.

The last time I saw you, we were both giving talks in Singapore at an aging conference, in the old days when we used to do that instead of just projecting ourselves virtually. We were so struck by the benevolent dictatorship and the public health safety net I believe that probably applied to the elderly. I'm sure your eagle-eye noticed their policies.

You point out that policies and practices tend to be devoted to marginalized groups but not the elderly. Why is that?

Becca Levy: So that's a great question. I think it's both factors that occur at an individual level and a structural level. On an individual level, I think especially in ageist cultures, there is a lot of resistance, and fear, and anxiety about getting older, and I think that reinforces the negative age stereotypes and reinforces the idea of distancing and not including older people in activities including the workplace.

I think on a structural level, unfortunately, there are a number of industries that benefit directly from promoting the negative age stereotypes, particularly the anti-aging industry, which includes billions of dollars on wrinkle solutions, wrinkle creams, fighting aging, fighting aging is something that's a positive thing. I think that in particular promotes, through marketing and media, a lot of negative age stereotypes that lead to this exclusion of older people, both from different policies and practices.

Elissa Epel: Yes, okay, wonderful. We'll get to talk more about that. I didn't want to steal the thunder.

We get to hear next from Luigi Ferrucci. Welcome, Luigi.

He probably needs no introduction in this crowd. He is a geriatrician and epidemiologist who's the director of the Baltimore Longitudinal Aging Study, the Chief of the Longitudinal Studies section at NIA. For almost the past 20 years, Luigi has been directing research at NIA. He has just done so much service.

I just need to mention, my respect and gratitude go out to people like you who are constantly curating and shepherding these longitudinal studies that we learn so much from, that are so important. Luigi has been critical in many studies—the InChianti Study in Tuscany, Italy, the study of Centenarians in Sardinia, and of course, the BLSA study. He's also just a scientific giant in terms of aging biology and has done so much for explaining pathways, major highways, such as inflammation.

Luigi, welcome, and thank you for joining us.

Luigi Ferrucci: Thank you for the nice introduction, and thank you, Becca, for the fantastic talk. You should know that I love working with you, because you bring me back to the ground. Sometimes we work on a single molecule, a fraction of molecules, and we get excited about mechanisms, but you always remind me that those little molecules, those little cells, those are going to live in an organism that is alive, think in some way, interact with other people as part of a society. Those elements are very, very important to understand. What's happening in their body can have a strong effect on their bodies. I don't know how to react, really, at the same level of your very, very challenging presentation that certainly requires a lot of follow-up in terms of further science that I hope we can do together.

I will say that the role of older people has been fluctuating over history, and you can follow this in art, in painting, in music. For example, some classical paintings, like this in Padua, really look at the elderly as those teaching the wise story about how to behave in life. We know that this is only a small corner of how the elderly are treated and considered today.

What I'm going to say is from the perspective of gerontology and a geriatrician that the treatment of the elderly comes in many, many different flavors. I refer you to Becca’s presentation really for the details. What I'm going to focus my reaction is the fact that biological mechanisms are still studying young animals, with very good exception. I'll give you a couple of examples.

One of the things that I want to point out is that our fight to promote inclusion of underrepresented minorities is absolutely relevant for this discussion, because there's a double hit. There are data showing that underrepresented minorities' age are also more disadvantaged than non-underrepresented minorities that reach old age.

Finally, this is an argument that has been discussed many times. I want to still say that, despite the many, many efforts, older people are still often excluded for participation in trials that are aimed at approving drugs that in the end they are asked to be the real users. So it really makes absolutely no sense to exclude them.

One thing that, one example I want to give you is an old study that looked at the effect of mineral status on female mice. And then, this is an old study that really strikes me as an example of the past, hopefully, where they looked at the mice that were two 2, 6, and 10 months old. They pretend that by comparing them cross-section, they understand the effect of ageing. I want to show you this is a very finial lie on the effect of mineral forming on survival. You can see that this red line that they have here is at 360 days, which is, you know, something around 1 year. And so, even you know, if we look at the first year of age instead of 10 months, you can see that there's really not very much change in this curve for mortality. So aging has just started barely, and so we need to learn much more in terms of the continues of the lifespan.

This is another example in which, you know, the author looked at health and age-related change in behavior in these C57BL mice. They looked at, as you can see, the 2, 4, 6, 7, and 12th months. Clearly, they completely ignore the rest of what's happening.

I could say, you know, I have to tell that the NIA did, really, wonders to avoid this by providing old mice to people that have grants and with NIA, but that's only part of the story. Because if we still keep thinking that the normal physiology occurred in young age, and there is not a physiology of the lifespan, we only look at a very little piece of the puzzle.

The story that I told you before about, you know, the double hit that underrepresented minorities have during the lifespan was really prompted to me by reading this article in the *Washington Post*, where they had 150 people screening about 100 resumes each then provided judgment about hiring or not hiring. And you can see that, you know, the difference between White and African American is mostly strongly affected in young age, but then the research faced again, you know, the reentering in the workforce. In this case, there were high-level and sometimes scientifically-related jobs that appear to be really important. I think that work that looked at those two potentially synergic conditions that lead to discrimination will be extremely important in the future.

This is another study that had may people talk about and was published in *PNAS*. It looked at the odds of employees, scientists actually, that exit from the, you know, from the workforce. You can see that, you know, if you compare the 1993 and 2008, there is really a dissociation where more and more individuals of old age decide to remain as scientists in the working environment. For example, this is a typical event occurring at the NIH, and then I have seen in all honesty, some nasty and not agreeable discussion about this. Because I think that in all the cases I know, and probably in the majority of cases, these individuals are the best and the brightest, are those that really carry the experience and can train the new generation of scientists. And, of course, it will be important that we maintain a very, very high standard. But making judgment about age is certainly not the solution to this problem.

This is really reflected in also in the discussion that is occurring with the surgeon, whether the surgeon is too old to operate. I participated to recently one of these discussions, where very, very brilliant surgeons that we're still creating new techniques prompted the idea that, yes, you need to be tested, the performance manual dexterity, and, you know, some intellectual functions need to be evaluated, because we know that those functions tend to decline with age. But there are many, many and the growing number of people that even in very late life maintain absolute performance.

Again, I want to talk about exclusion. I have two slides that I want to just show you very quickly. These are very, very recent drug cancellers. It's a platelet-aggregation inhibitor and then there are a number of other drugs that are mostly anticoagulants that are used in mostly older people in atrial fibrillation or in the prevention of adrenal thrombosis. And you can see that this black line represents the identity between the population, the composition of the population of users and those that are included in clinical trials. And you can see that in many, many cases the over 65 and especially over 75 are absolutely underrepresented in this trial. And this has really happened in the last few years. So, in spite of greater attention to this problem, this is still happening.

This is a paper that was aptly published by Marie Bernard. Excuse me, Marie, but I had to redraw this picture because I wanted to make the case that all the clinical trial phase III that are recorded in NIA, at the clinicaltrials.gov between 1965 and 2015. The number of exclusions of those 75 years old is still very, very high. For drugs, for conditions that are very, very frequent in the elderly, such as arrhythmia, coronary artery disease, heart failure, stroke, and congested obstructive pulmonary disease.

The *BMJ* in 2001 said that we need to launch, you know, something to reduce the discrimination of elderly, especially in the context of health care. And I think that we need to reinforce this message and understand, as Becca was saying, that this is as much as a problem of physiology as a problem of society. That we need to turn aging into a positive aspect of our life and take a life course perspective where every age of life has its value. That we develop the culture that really appreciates that.

Thank you, Becca, and as I said, it's always a pleasure working with you.

Elissa Epel: Wonderful. Thank you so much, Luigi. Stay with us and we'll invite back. We already have some great questions, and I'm already just, you know, my mind is racing with this dialogue and the level, what we're at.

We can talk about mechanisms and specifics, but I think we're also, we have time to get to some of these big issues. We have wonderful people joining us here like, Richard Hodes and other leaders in aging. It's always exciting to have a NAM meeting, to have such a distinguished group in the audience.

We did have a hand raised from Ron DePinho, so I'll call on you first.

Ron DePinho: Hi everybody. It's good to be here. Those are fantastic talks.

I just wanted to add a sort of mechanistic element to the first talk in particular. And this is well known, but just I'm really struck with the curve of showing that this notion that when you have these early entrenched perspectives that that has an impact on cardiovascular disease later in life. I mean it almost

looks like hypertension. And so that begs the question as to whether or not, if we really understand the mechanism striving that. Are there therapeutic opportunities for us to, you know, diminish or bend the arc of that trajectory?

And of course, I'm sure this group knows very well the work in telomeres. Richard and I actually did a lot of work on telomere mechanisms and so on, over the years. We generated the knockout mouse and studied it and so on, and many contributors have shown that chronic, unrelenting stress instigates telomere damage. And damaged telomeres can have very significant effects on virtually all hallmarks of aging.

So just wondering whether or not in those studies, whether it would be possible to ascertain telomere status as a surrogate, almost a cholesterol-level or C-reactive protein–level biomarker that can help us identify those that might, coupled with the right sort of questionnaires, etc., of whether or not that might be able for us to identify this high at-risk population for which therapeutic intervention might be more beneficial.

Thank you.

Becca Levy: That's a great idea. I think that that's a wonderful area to go forward and think about the role and, although I know Elissa's doing a lot of work on this as well.

Yes, I think that that would be a great area to look at as both a mechanism but also potentially identifying people that are at higher risk that we may want to target.

Elissa Epel: Okay, I just have to add quickly. Thank you so much, Ron, for this comment.

I think that telomeres have stood the test of time in meta-analyses for predicting degenerative disease and certain types of cancer. I think there's been a little, you know, question about the measurement, and I will say a big question. There is a telomere research network funded by NIA and NIEH that has really put forward some gold standard measurements so we can use the PCR, which is so important to our larger population-based studies, with more reliability. I think that will help.

We're doing studies looking at prediction of COVID antibody response, looking at telomere length in the different cell types, for example, using Peter Lansdorp's method, María Blasco's, the PCR, the Southern blot, so really comparing a lot of methods, as well as the tips, the breaks in telomeres. And, of course, your work has been absolutely fundamental to putting this area more on the map with cancer, etc.

Thank you for your comment.

Ron DePinho: Just a quick thought on that, because I do recognize that it's really challenging just to look at telomeres. But you know, we had shown that when you have telomere dysfunction, it has a major impact on the pathway that is important for mitochondrial biogenesis as well as for regulation of oxidative defense. I would argue that telomeres are very important, but if they're complemented with measurements of telomere, of mitochondrial mass or function, or looking at oxidative damage, or even

the expression of oxidative defense genes, that together, that I think that would really enhance, make more robust, that biomarker, which is really this connection between genotoxic stress, mitochondrial function, and oxidative damage. If you do those three, I would bet that you'd have a very robust biomarker that when complemented with the stuff that Becca does.

Elissa Epel: [UNINTELLIGBLE] just said the exact same thing to me that we need to measure the tripart, we need to think of it as a network, and we're going to have a stronger pattern and results.

We have a hand raised from David Allison. Welcome, David.

David Allison: Thank you. Terrific presentation.

I have a question very closely related to the one Ron DePinho just raised, and then a sort of extension of it. So, the question is, given that it's unlikely that we all want to study the longevity of an organism that lives as long as we do, namely humans, we do need the biomarkers. What does it take to make us convincing that we have either a single or a composite biomarker that we can hang our hats on and say, yes, in a randomized controlled trial in humans, I observed the change of this in a few years; therefore, I can say I've really slowed senescence. That's part one.

Then, part two is, if you believe that senescent cell burden is part of that, to what extent do you think microchimerism, particularly as we have a model for it in fetal maternal, microchimerism is a potential buffer against or moderator of the deleterious effects of senescent cells.

Elissa Epel: That's to Luigi.

Luigi Ferrucci: So, so I think that, you know, that they can certainly address the first question. But I think that what we've been discussing now is a personal research agenda for me to work with Becca for the next grant. Because, as you well know, most of what the BLSA is doing now is to develop phenotypic and biological biomarkers of the pace of aging. And so that is a big challenge. We can't really in any way demonstrate any intervention that is reducing the pace of aging if we will not be able to measure, you know, the rate of aging.

And so, I think there are some of them that are very promising, certainly telematics is one of them, and there are work at the NIA that is going to be on that. I think that the epigenetic clock is certainly one that we want to work a lot more on, because I think that the latest developments are really promising. I think, certainly, the senescence is one that is important. The problem with senescence is that it's very difficult to measure, and because it really will have to be measured in tissue.

Our approach has been that we measure in tissue in a limited number of individuals, and then we see whether, by doing proteomic in plasma, we can capture a signal of senescence. If we can, then we can use that signal from a blood sample to really understand.

Your question about microchimerism is really interesting, but I don't know enough really to give you a sensitive answer, honestly.

Elissa Epel: Thank you, Luigi.

We have about 10 more minutes. I am inviting people to use chat, because otherwise we have this kind of rigid sequential dialogue that Zoom limits us to, and there's so many great ideas and inputs, perspectives from our audience. Please feel free to respond to David or Luigi here.

I'd like to ask a question back to Becca, your intervention for age-related beliefs. We've got two related questions. Sharon Inouye asks, can you tell us a little bit more on what you did to combat ageism at the individual level? And Consuelo Wilkins wants to know, have you looked at this data by socioeconomic status, race, and ethnicity?

Becca Levy: Yes, thank you. Thank you for those great questions.

In our intervention that we conducted, which was a field study, so we went out to people's homes and brought with us laptops. What we did was we once a week for 4 weeks expose people implicitly to positive age-stereotype messages. So, unlike some of our lab studies in which we randomly assigned people to either a positive or a negative age-stereotype condition, we felt when we did the field study that we didn't want to expose them to negative age stereotypes; we felt like that would be unethical. In this study we actually just compared them to positive age stereotypes and the neutral condition. And the neutral condition we presented kind of random words on a laptop, in the positive age-stereotype condition we presented positive age stereotypes on a computer screen at speeds that allow for perception without awareness, so we were presenting different positive images, but we also had an explicit piece of it in which we asked people to write an essay about a positive, active older person. We did find that made a difference by repetitively exposing people to these positive messages in different ways, which I think does have implications for ways that we could go forward on a larger scale

In terms of looking at different groups by socioeconomic status, race, ethnicity—in in our field study, which we just completed, we didn't have enough people to actually stratify, so that's the direction that we're going forward, to be able to stratify. But we did adjust for different factors, so we know that above and beyond socioeconomic differences, that we still we see the effects in all the groups that we have looked at. In our bigger, longitudinal studies we are able to pull apart by stratified groups. We find, we have found in every, just about every group that we could think of, we found the effects of these positive age stereotypes leading to a beneficial health outcomes.

Elissa Epel: We have a question about—well I'd like to hear both your top-down and health care provider ideas for intervention.

You mentioned we could do a campaign. And when we do these public health campaigns, they take about 10 years to actually see change in the data. I'm just wondering, is that really the right way to intervene? You have these nice potent individual effects. You probably have ideas about targeting

health care providers. This was a question by Carmen Garcia-Peña from Mexico, how do we target the medical systems bias, and are there any shortcuts here? Do we have to do the billboards and that kind of really small effect over time?

Becca Levy: I think that there are a lot of different ways that we can promote positive age stereotypes and reduce ageism. I think some of them will take—so I think the World Health Organization campaign, I think they're actually saying it it's a 20-year campaign before they think that there will really be world changes. But I do think there are small changes that can happen much more quickly. For example, even just adding age to all these diversity and equity programs that are already in existence, that people are already being exposed to in the workplace, it wouldn't take a lot of work for age to be added and to raise awareness in a really important, structural way. Yeah, I think there are definitely some short-term but very potent changes that we can make to overcome structural ageism.

Elissa Epel: Luigi, did you have a comment.

Luigi Ferrucci: Well, I think that one of the problems is that the health care systems really has lost contact with the consumers. We used to have the doctors that were not only providing prescription drugs but also maintaining the contact and have some educational aspect, especially in the smaller town, and we don't have that anymore. We rely on access to the emergency room that are crowded and provide absolutely no human aspect of what the people need. I think that finding ways that our health care system provides this intervention that will eventually improve health; and so they need to come from there. I think that that's something we need to think of, knowing that changing behavior is the most difficult thing that we do.

So, I think that 10 years, I wish we could do it in 10 years, because it's kind of an optimistic but not impossible timeframe.

Elissa Epel: So I'm going to, well, I was about to turn it over back to Walter, but we're going to move on to our next one. We just got a question, important question, from Sharon Inouye, so I will end with that.

Sharon, do you want to ask it live?

Sharon Inouye: Thank you so much. Hi Becca, Luigi, Elissa.

I have been involved in a lot of inclusion efforts nationally, internationally, and I've been finding, encountering repeatedly, a lot of resistance to including ageism with our other DEI criteria, even at the NIH. Dr Hodes, Richard, you know that the argument I keep getting is, well, it falls under intersectionality; the older, minoritized populations are the most at risk.

But I think that's a very limited focus. I think ageism, as you've shown, and I know I'm kind of preaching to the choir here, is a huge factor. I'm wondering if we can find a way to get ageism represented in these other initiatives, and how to do that? Because I really do feel it's a very difficult issue.

Elissa Epel: Thank you, Sharon, thank you for your very pointed comment. It looks like Richard has a response.

Richard Hodes: Well, my response is to is to point at Marie who's answered in the chat and can speak to the way in which NIH has very broadly appreciated the importance of a lifespan perspective, including inclusion in research and beyond. Marie, in addition to your chat offer, do you want to mention something further?

Marie Bernard: I would just like to say that the data that Luigi shared were data that helped us develop a policy at NIH on inclusion across lifespan. It went into effect as of January 2019. And when the second Inclusion Across Lifespan Workshop was held September 2020, The Center for Scientific Review was able to say that we have gotten far away from the issue of arbitrary exclusion of older adults, based on age limit at least. Only 2.5% of applications at that point, and that's more than a year ago now, seem to be noncompliant; and of course, they're not acceptable when they're noncompliant because of the new policy.

The other challenge, of course, excluding people based upon multiple chronic illnesses, is a big one. That's something where there's going to need to be further evaluation and possibly further enhancement of the policy.

Richard Hodes: And just to just to emphasize what Maria said, I think we all want to be careful not to be overly regulatory or intrusive as a federal agency. But if you want an example of a way in which making requirements a criterion for funding and carrying out research can have an effect, not in 20 years or 10 years but in a shorter timeframe, this is one of those examples.

Elissa Epel: Wonderful. Well, it's great to end on that positive note, to hear about real changes that are being made. Thank you so much, Becca, for your, really lifelong body of work that is really being spread to other research groups, and young students, and areas. This was a fantastic conversation. Luigi, thank you so much for being such a relevant and powerful discussant today.

Back to Walter.

Walter Frontera: Thank you very much, Elissa and to all the speakers and the participants in this part, first part of the program. We're now going to move on to the second part of the program, and I'm going to ask the Vice Chair of the planning committee, Judy Salerno, to take it from here. Judy?

Judy Salerno: Thank you, Walter. Those last questions were a great segue to our conversation, which will now shift to looking at a focus on diversity and the research workforce, with particular implications for aging research. I realize it's a lot to sit through 2 hours, so if you want to put yourself on nonvideo and stand up and do some jumping jacks, go ahead. I know it's tough, if your home office is anything like mine, to sit for long periods of time. Feel free to move around off camera.

It's my great pleasure to welcome our next speaker, who is another person who does not need an introduction. Dr Marie Bernard was the Deputy Director of NIA for the past 12 years and a colleague of mine, for many, many decades. In October of 2020 she took on a new position at the NIH as Chief Officer for Scientific Workforce Diversity, following the founding director of that group. She's played a key leadership role throughout her time at the NIH on diversity, equity, and inclusion. She's a founding member of the Diversity Working Group and NIH Equity Committee, and co-chair of, as you heard, the NIH Inclusion Governance Committee, which oversees inclusion in clinical research by sex, gender, race, ethnicity, and age.

So it's my great pleasure to welcome Dr Bernard today and to ask her to talk to us about the scientific workforce and what the future holds. Thank you.

Marie Bernard: Thank you so much, Judy. It was really an honor to become the deputy director of NIA in 2008 following you. And it's been an honor to be given this opportunity to move on to become the Chief Officer for Scientific Workforce Diversity.

I'm going to very quickly give you a 50,000-foot view of why this is important. I know I'm preaching to the choir here. I'm going to start first with a case example, and then I'm going to pivot to talking to NIH's value of scientific workforce diversity and very specifically, the NIH UNITE initiative.

The case of aducanumab. I know you're all very familiar that it was approved by the FDA for an accelerated approval pathway. I know that getting nabaran—I probably mispronounced that—was just approved. I don't have the data relative to it, but aducanumab really caught, at least my attention, that of many others because it was the first FDA-approved drug that was based on its effectiveness in reducing amyloid plaques. As we know, amyloid plaques, tau tangles develop amyloids years to decades before symptoms. Theoretically, something like this that would get rid of, or slow the process, would help with the illness.

The trials were limited to people who were diagnosed with mild cognitive impairment or early-stage Alzheimer's, which would be appropriate given what we know of the pathology of the disease. Initially, it was approved very broadly, and that was revised so that the labeling criteria was consistent with the trial criteria.

However, it's a challenge when you're thinking about the extrapolation of these indications of the trial data to underrepresented racial and ethnic groups. These are groups that more often have missed or delayed diagnosis. Missing diagnoses are common, quite honestly, across the spectrum for non-Hispanic Whites, some 41% of people seem to have delayed diagnosis, but for African Americans, Blacks it's 46%; Hispanics, Latinos, it's 54%; so there are implications to this.

Additionally, the drug was listed at $56,000 per year, and there are additional cost of IV infusions at a specialized center, PET scans or CSF testing to detect amyloid, MRIs at baseline and periodically thereafter to monitor for side effects. This raises questions about how accessible this will really be for groups that are underrepresented in the general population.

Just looking at the data with regards to income, this drug has implications across the board, because the highest median income is among Asian populations, followed by Whites, followed by Hispanics, followed by Blacks, but you know, $56,000 a year is a lot. Third-party payers will have to pick this up for people to generally have access to it.

Even more concerning, however, is the phase III trials that were the basis of their approval by Biogen's proposal; 89% of participants were White, 9% were Asian, which means very few who are from underrepresented groups that have the highest prevalence of the illness, African Americans, and Blacks, Hispanics. This, I would posit, is representative of the challenge of not having sufficient diversity among the scientific workforce that would be developing the trials and thinking about the drug among the workforce that would be going out and recruiting subjects to be involved in the study.

We know that for drug development, it's really important.

We know that Black, African American, Hispanic, and Native American physicians are more likely than White physicians to practice in underserved communities where they can be the outreach to those populations, and we know that those populations, when they have a choice, would prefer a health professional who represents their own racial or ethnic background.

We also know, from the NIH perspective, that we need everyone to help us to solve the big challenges in biomedical science. It's like trying to describe an elephant without having sight and having people who come from lots of different perspectives, personal experience, professional experience helps us to make better science.

This is demonstrated by burgeoning literature. A wonderful study by Freeman and Huang that looked at some 2.5 million published journal articles to look at the frequency of which they were cited and the impact factor, and they developed what they called the Homophily Index—the more homogeneous the author group appeared to be, based upon last names and guessed-at ethnicity, the higher the Homophily Index, the lower the impact factor; all the way out to very low Homophily Index and high impact factor. Of course, you'll look at that and say, Marie, that's 10 authors, it's different types of science; I agree. But when you look at things like geographic diversity, information diversity based on who they're quoting, all of these things point to diversity making a difference. There are other studies that speak to this as well.

We also know that there is burgeoning talent. The most recent Census data can reinforce this, that we are not necessarily fully taking advantage of. When you look at who gets in an R01 grant equivalent from NIH versus who's in the STEM workforce versus the general population, it looks like we have really good representation among non-Hispanic Whites. One could argue there's super-representation of the Asian population, but there's a lot of lost opportunity among Hispanic or Latino population, among the Black and African American population; and American Indian, Alaska Native, Native Hawaiian. Pacific Islanders are so small that they wouldn't even register and they're not shown in this slide.

We know as well that when you go through the professoriate that when you start off at the instructor level, you have underrepresented women, well-represented women, underrepresented men, well-represented men in much greater proportions than you see when you get to the professor level and the department-chair level. Again, arguing to the fact that we're missing out on talent when we're trying to tackle some of the big problems of biomedicine.

So, what are we doing? NIH has developed this position of the Chief Officer for Scientific Workforce Diversity as was noted. I'm the second COSWD; I was honored to be asked by Francis Collins to step in this the acting COSWD last October. I was the COSWD and deputy at NIA. At the end of May, I was officially made the permanent COSWD and stepped away from many of the duties that Judy was talking about that I'd held, fully focusing on this role.

I also co-chair this NIH UNITE Initiative. So what is NIH UNITE? It's an initiative that got started last year, right after the videotaped murder George Floyd as we were very cognizant of the high morbidity and mortality among communities of color. It brought really stark relief to, put into stark relief, of the ongoing reality of racial injustice in our country.

There were a series of intense institute and center director meetings starting in June of 2020. There were, a self-assembled group who came forward. In particular, a group called 8CRE, 8 Concepts for Racial Equity, a group of relatively early-career scientists who brought forward objective data case studies to Francis Collins and Larry Tabak, and then to all the NIH leadership, demonstrating that the issues of racial injustice were not just outside of the United States; they were at the NIH as well.

And it led to a shared commitment that we must address structural racism, that we're at a tipping point; we couldn't let the moment pass. So, in February we unveiled this initiative—five interacting work streams: one to understand stakeholder experiences; another to develop new research in health disparities, minority health, and health equity; one to look internally and to address our own culture so that we could role model what it is that we're going to be asking of the external community; another to hold us to be transparent, to communicate, and to be accountable for what we're doing; and last, one that's looking externally of what needs to be done at the ecosystem, with the ecosystem.

We said on February 26 when this was unveiled that this is a marathon, maybe even an ultramarathon. But the mile markers along the way would be reports out to the twice-yearly Advisory Committee to the Director meetings. So June 11, when we reported out, this is what we said. We said in February that we publicly commit identifying and correcting any NIH policies or practices that may have helped to perpetuate structural racism; and to that end, Francis Collins on Friday, February 26, made this statement on Monday, March 1, that's published on the website, the NIH website, where he apologizes to individuals in the biomedical research enterprise who've endured disadvantages due to structural racism. And he's gotten lots of positive feedback from the Advisory Committee members and others for taking that stance.

We said that we will continue to aggressively implement approaches to address the Ginther Gap to enhance portfolio analysis. What's the Ginther Gap? It's the *Science* 2011 publication, led by Donna Ginther, Raynard Kington, and others that shows that there was a persistent disadvantage for African American and Black scientists in receipt of our own R01-equivalent grants even when you controlled for all sorts of factors. Initially it was seen from multiple underrepresented racial ethnic groups, but it was persistent for African Americans and Blacks.

We know that we are on a slow trajectory to that being corrected, but we intend to accelerate it. These are data from 2013 and 2020 with a 2018 data point that shows there is a trend of increased applications for African Americans and Blacks. Such small numbers for American Indians, Alaska Natives, Native Hawaiians, and Pacific Islanders that you can't even see them. Small numbers relative to their numbers in the general population of Hispanics and Latinos. So you know, but improvement. And improvement in success rates as well, although the gap persists and the numbers are very small. We're working to address these things.

We said we would launch a multi-phased, -tiered, and -integrated Common Fund Initiative focused on transformative health disparities research, and to that end, it was published, amazingly to me, just a month later as a Common Fund solicitation. Just this week, the awards were announced, with six awards going just in general for that; five for interventions focused at minorities serving institutions, and there will be an additional competition for the second FOA in fiscal year 2022.

We also said that we were going to ensure robust NIH-wide commitment to a, then in-development, NIMHD FOA on structural racism and discrimination and impact on health. And sure enough, that was published less than a month later, with 25 institutes and centers supporting it. My understanding is that there was a very robust response to the solicitation that closed August 24.

A bonus, the NIH-wide BRAIN initiative put forward a funding opportunity announcement that for the first time includes a plan to enhance diverse perspectives as a consideration for scoring. We're all very excited about this; we're looking forward to seeing whether it has the impact in helping to diversify the scientific workforce that's anticipated. Certainly there's several other FOAs that have already used that language, and several that are in development use the language.

And we said that we would develop sustainable process to systematically gather and make public the demographics of our internal and external workforce, paying attention to the issue of transparency or the concept that sunshine is the best disinfectant. To that end, we now have posted on our website in the OER database data by race, ethnicity, and disability status for funded investigators, as well as career stage and gender. Its data like these that leave me feeling pretty confident that when you think about the study of aducanumab that was sponsored by Biogen, although it's not our study, that there probably was not a lot of diversity among the scientists who were involved in putting the project forward and developing the outreach.

We also have our own internal data published by race, ethnicity, and by job categorization.

So, we also pledged on June 11 that we're going to do a number of things between that date and the next Advisory Committee meeting in December. I'll tell you what those are, give you some updates on some of them. One of them was to thank President Biden for putting forward a proposal for much more funding for the Minority Health Institute, Nursing Institute, Heart, Lung, and Blood, and Fogarty International Center. Those are institutes that have disproportionate numbers of African American, Black, and other underrepresented scientists applying to them, but they have lower-than-average R01 success rates. We're currently in a continuing resolution; we'll see what happens for fiscal year 2022.

We're encouraging institutes and centers to develop their own disease-specific and topic-specific areas related to health disparities research. I can tell you that I know there's a lot of activity along those lines,

and we will probably be seeing, you'll probably be seeing a number of those associations released in the near future.

We said that we would develop programs to spur institutional culture change in support of inclusivity and equity. I'll give you an update on one of those. It's something called the Faculty Institutional Recruitment for Sustainable Transformation program. This was actually released in December of 2020, but it was built in the spirit of UNITE—there was a lot of work being done internally, as I said, before UNITE was externally unveiled. The intent of this program is to create cultures of inclusive excellence at multiple academic and research institutions across the country. It's modeled after what has proven to be a successful program within NIH called the Distinguished Scholars Program. It called for faculty cohort model of hiring; multi-level mentoring; integrated, institution-wide systems to address bias, faculty equity, mentoring, and work/life issues; and the funding of a coordinating center to evaluate all. The funds come from what's called the Common Funded NIH, some $240 million over the next 9 years.

And these are the first cohorts that have been funded. I will publicly say thank you, Richard Hodes, for being among the ICs that help to extend the payline for this. So, you see here come high-resource institutions, low-resource institutions—Tuskegee-UAB application is a collaboration. I'm very excited about this. There will be two more rounds: there will be one in fiscal year 2022—those applications have already been received, and one for fiscal year 2023. Morehouse School of Medicine is the coordinating Center for this.

We also said that we would increase career opportunities for underrepresented groups, starting with the Science Education Partnership Award that targets K–12 STEM education. That solicitation of IC sign-up is ongoing.

We said that we will examine staff interactions with applicants to make sure there's not, there is no bias or inequal treatment that might impact the scientist's likelihood of pursuing funding opportunities; that we would expand our interactions with and our support of historically Black colleges and universities, tribal colleges and universities, and other minority-serving institutions.

That, in a whirlwind, is where we are with regards to unite. I always like to close with this quote from the Reverend Dr Martin Luther King because we've heard from many that they don't necessarily see themselves here. What about intersectionality? What about people who don't recognize themselves as having come from a racial ethnic minority? But as Dr King has said, "Injustice anywhere is a threat to justice everywhere. We're caught in an inescapable network of mutuality tied in a single garment of destiny. Whatever affects one directly affects all indirectly." Our viewpoint is that, as we step back and look systematically at everything that we do at NIH—policies, procedures, practices—our goal is for us to have a fair and equitable environment, and it will benefit everyone.

We have summarized this in a commentary in *Cell* that was published June 10. There will be a commentary in *Nature Medicine* coming up in November that is launching a diversity series that they are starting that gives a little bit more advanced discussion of what's going on, other diversity initiatives at NIH.

These are the 80+ people who made this move forward. These are all volunteers. The only people who are actually paid for doing this are Marzjah Esther, who's a program support person; Victoria Rucker, who's the program manager; I'm very honored to co-lead this with Larry Tabak and Alfred Johnson and

very excited about the possibilities that are going to come from this and other diversity initiatives. I think it's going to translate into much better science when we're thinking about the studies of older adults.

I'll just close with our favorite adage, “Great minds think differently.”

Judy Salerno: Thank you so much, Marie, that was a great overview, and thank you for your leadership and for the leadership of NIH for taking these very public and rapid steps to address structural racism in biomedical research, since NIH influences the landscape so much. This is really wonderful. I'm very struck by the public acknowledgement of what has happened, transpired at the agency, because you can't fix what you don't recognize. So I think it's really a giant step forward, and we look forward to discussing this more in our Q&A session.

Right now, I would like to introduce another leader. Dr Consuelo Wilkins, who is Associate Professor of Medicine and Vice President for Health Equity at Vanderbilt University Medical Center. She's the principal investigator on three NIH-funded centers: the Vanderbilt-Miami-Meharry Center of Excellence in Precision Medicine and Population Health focusing on decreasing disparities among African Americans and Latinos using precision medicine; the Vanderbilt Recruitment Innovation Center to enhance recruitment and retention in clinical trials, a huge problem, as we all know; and the Vanderbilt Institute for Clinical and Translational Research. She's pioneered many, many methods of stakeholder engagement that involved community members and patients in all stages of biomedical and health research.

We look forward to your comments, Dr Wilkins.

Consuelo Wilkins: Thank you so much for the opportunity to share any stage with Marie Bernard. I'll just quickly add that my titles have changed. I think Judy said, the bio you received, I am a professor of medicine and just in July, now Senior Vice President, so probably taking on too many roles there, but what I wanted to share that.

I think it's really amazing, the work that has been done in this area, focused on diversity in the scientific workforce. Also as a card-carrying geriatrician, I'm especially delighted that Marie's got a role in helping to lead this.

I do have a few slides that I've prepared to share a little bit about my response to this. My key points that I really want to make are, I think it's important that we distinguish between diversity, which we are often talking about in the setting of equity and inclusion, and health equity, so this impact on aging research. We are conflating sometimes these terms, and I think that makes it sometimes challenging for us to understand which policies need to be adjusted and why. And I also want to say that, as we think about the diversity from the standpoint of demographic diversity needed to impact aging research, we also need to think about the diversity of disciplines needed to really change aging research. And then the last point I want to make is about resisting the idea that concordance in scientific workforce with a population of people is the answer. We can't use that, as through this opportunity to, for each of us to advocate our own responsibility for understanding these underlying structures that have marginalized and oppressed people and have led to many of the inequities that we have talked about today so.

When I think about diversity, equity, and inclusion, I think most of the time, we are also talking about the race, ethnicity, gender, background, culture, language of the individuals in the scientific workforce. I think that's obviously very important, not just from the standpoint of, again, we need people who look like others. But if we're if we're really prioritizing excellence, then we have to acknowledge that diversity equals excellence. All of the data, some of which Marie has already shared, that that focus on more innovation, better outcomes, publications in higher-impact journals, all of these scientific outputs as well that are associated with diversity of teams.

That is different than health equity. So when we talk about health equity, we're talking about everyone having a fair and just opportunity to be healthy. Some of what we've talked about today, including Becca's presentation about ageism, really I think falls into this health equity space of, you know, are we providing fair and just opportunities for people to be healthy? And that is different from the diversity of the workforce. Although there certainly may be some overlap, and people who have lived experiences, that have been from marginalized and oppressed groups, may be less likely to have portrayed any of the ageism, but that's certainly a broad statement and not necessarily at the individual level.

What we need for everyone, including older adults to have these fair and just opportunities to be healthy, again, requires a different way of thinking about who's at the table, who's developing and implementing the science. I think for a long time, we have continued to reject our role as scientists in perpetuating and maintaining these systems of racism and inequities. We have a long way to go from the standpoint of scientists before we can really even begin to think about how we move forward towards equity, health equity, if we don't recognize these systems, these structures that are really requiring, limiting how we actually discover and can implement scientific findings.

I think an important example—these two graphs I'm going to show are actually created by the American Medical Association: they've done an amazing job in the last couple of years with this focus on racial justice. If you can follow this certainly very busy graph here and just look at what is not a surprise to most if not everyone. We are already familiar with the Japanese internment camps that were put in place from a policy just after the Japanese attack on Pearl Harbor. Over 100,000 Japanese Americans went into these prisons in 1941, and more than half of them were children. These children are older adults now. To imagine that we're talking about caring for populations of people who had very different experiences growing up in the United States and not recognizing the history and the downward consequences means that we're not really fully capturing all of the information needed to understand health among these populations.

Similarly Black African Americans in this country were marginalized and oppressed for many years. If you were a 16-, 18-year-old graduating from high school in 1966, this is at the time of the 1965 time of the Civil Rights Act, depending on where you live in the country, you had a very different experience. You might have lived in the rural Mississippi Delta, which is where I'm from, and had to split your school year because you had to stop and chop, cut, and pick cotton like my mother did. Not being able to understand these social circumstances and how people actually, and how that impacted their lives, and, you know, what are the environmental changes? Do we understand the DNA methylation that has occurred because of that? Are we capturing that in our research? Probably not, and I and some colleagues have written about this.

In addition to the inclusion of individuals from these diverse backgrounds in our research, we need to have the data from all these different perspectives that includes social determinants of health to fully

understand disease and be able to create, develop interventions to increase lifespan, to understand health and well-being. We can't just think about more people from these backgrounds. We won't be able to actually understand disparities if we're just focused on increasing the number.

And I think this speaks to overall how we need to consider the kinds of research we do. We can't make excuses for not having a sample size, that is large enough to understand disparities. I think Marie's bringing up of aducanumab—it's really unconscionable in my mind that a disease, Alzheimer's, that is up to two times more likely to impact Black and Hispanic Americans to not only not even have a minimum number of people from these backgrounds in the study, certainly not representing the burden of the disease in the country and the world. We cannot tolerate or accept as scientists, as funders, as editors, publishers that science is being produced without acceptable numbers of individuals from these marginalized and minoritized backgrounds. This is bad science, and we should be rejecting it wholeheartedly.

I think I'll stop there. Thanks.

Judy Salerno: Thank you so much. This has been a very rich conversation.

I would like to start off, we don't have much time for questions, but I'd like to start off by asking both Marie and Consuelo, you both brought up the issue of high prevalence in certain underrepresented groups but low participation in clinical trials. So how do we in aging research approach this in a way where we're not, we're focusing on both -isms—racism and ageism.

Thoughts?

Marie Bernard: I would like to start, and I know Consuelo could elaborate very generously, but that was the whole reason that there was an Inclusion Across the Lifespan Workshop II in September of 2020, because we were hearing loud and clear, particularly from the aging research community that it's a great policy, but there will be people out there, in fact the majority of people out there who are doing clinical research who aren't familiar with this, and they need some tools. So I would really encourage people to take a look at that workshop summary and some of the tools that were pointed to there.

It's not just simply, you know, you check the box and make things happen, as Consuelo has said; there's a lot more to it. So I'll toss the ball to you now, Consuelo.

Consuelo Wilkins: Thank you.

I would always start with the issue of trust. We often talk about trust in a way that is putting the blame for lack of trust on people who are not participating, and I think we should flip that and ask if we are trustworthy enough. To be trustworthy means that we are designing research with the participant, potential participant in mind, so that's from the standpoint of age, and race, ethnicity, culture, background. Is the study designed so that it is decreasing the burden on the potential participants? Is it accessible to them? All of the issues that we've had with trying to make sure that the language is

culturally right but also is it, you know, are the words big enough? Or is it at a time and place people want and end can get to?

I think we have to substantially change how we think about the participant's journey if we're going to be inclusive based on age, race, ethnicity, socioeconomic status. We've got to reject that we know how to do this, because we've done it poorly. And I think we need to bring in those voices of people, including potential participants as well as social scientists, onto the team, not just as know folks to help recruit but to help really think about the study differently.

Judy Salerno: I think that's a great point. We have not done a good job giving voice to people who have not been heard around research and the burden of disease. So, thank you.

We have a question from, a couple questions from, a question from George Hill. What may be some reasons why there's a higher incidence of Alzheimer's in the Black and Brown populations?

Consuelo Wilkins: I'll jump in and say that there certainly is data that cardiovascular risks are associated with Alzheimer's disease. As most of you know, there are higher incidence, prevalence among groups that have been minoritized being marginalized. I will say that, interestingly again, as it relates to aducanumab, which for those of you who are not familiar, really is focused on amyloid, which is one of the proteins, the key proteins associated with Alzheimer's disease. I'm involved in a study now that is looking at amyloid PET imaging, and the preliminary data that we have from that study actually shows that even though African Americans and Hispanics and Latinx elders have higher prevalence of Alzheimer's disease, they actually had less positivity, amyloid positivity, in these PET images. If we're creating drugs that are focused on amyloid and in these populations that have a greater burden, we may find that there's more vascular, coexisting vascular disease, and then we now have a drug that won't even work in this population, or may work differently I should say.

Judy Salerno: Thanks. Marie, would you like to comment on that as well?

Marie Bernard: I just would say, I fully support what Consuelo pointed out. There are also some studies that suggest that genetic manifestations of, or the genetic changes that are associated with Alzheimer's in various populations will vary. Yes, race is a social construct but there are some slight variations there and that may be associated with differences in manifestation, again, related to vascular disease rather than just pure amyloid accumulation. So we need to have those populations representatively included, and I'm really excited about the announcement that *New England Journal* has recently made about expecting that when there's going to be a clinical study published; that there's going to be data about who, you know, how the disease manifests itself, what are the populations in which it manifests, as well as the data with regards to the study that is being proposed. I think that's going to help people to really see whether or not there's been attention to the appropriate population.

Judy Salerno: Thank you. There are a couple comments in the chat about what we need to do to enhance DIA work within our institutions. One is that we need to pay for it—and I wholly support that as we pay for the time my staff and our organization spend on DIA work—and not overburden people of color and women with service, where we always seem to wind up. I think that's, and Sharon makes the point that cuts across all areas in STEM and academia. As to women, women of color, would you like to comment on that?

Marie Bernard: I would certainly say, yes, this should be a value. It should be at the top of the consciousness of leadership of organizations. That's the reason that Francis Collins' statement is so very meaningful, the fact that all the Institute and Center directors have bought into this and amplified it is really meaningful.

You can pay for services. I mean there's this tendency to want to bring in outside consultants to make this work happen, and that's one thing that we do need to be cautious about. We don't want people to feel like, okay, I've paid for the service, I don't have to worry about it any longer. It needs to be something that is part of the core values of the organization and that everyone feels that they have a role in. I agree fully that many times, the burden for making things move forward falls on women and people from underrepresented groups.

Consuelo Wilkins: So, in July I took on a role, or expanded my role, and now oversee the Office of Diversity at Vanderbilt University Medical Center. Before I was in the health equity space, and I would say that's where my career and my work has been up until then. You're really focused on the outcomes and people and the research related to that.

I actually intentionally stayed away from diversity. I almost rejected any role outright of being involved with diversity, because the work is undervalued, it's not incentivized in many ways, and it's also very hard. The burden of trying to change a system that has now decided that you're the person or the people that are responsible for changing it and not really recognizing how the structures and policies in place are continuing to perpetuate these lack of diversity, I would say, the lack of inclusion or specifically the exclusion.

We often talk about how you know this person is the first woman, this person is the first African American, this person is the first Asian in this role. And we don't take a step back to say what were the policies, practices, and culture that created this exclusion in the first place? Being in these roles where you now have all of this responsibility to change the system that is really resistant to change, whether people recognize it or not, and then, and then you have to absorb often this culture that is toxic, and devaluing the work, and triggering sometimes for you, and still trying to find a way to make it work.

I think there has to be increased recognition to really the incredible burden that people bear, and there needs to be incentives associated with it, including on the promotion and tenure track. If you really want people to change, it can't just be about effort or dollars or removing something else. Where does that fit in the overall institutions, and the Academy broadly, the Academy's goals, the principles, and guidance of who we are? That has to have value.

Judy Salerno: Thank you so much. We're out of time, and this has been a wonderful conversation on a very critical issue. I hope that this is the beginning and that we can look in our interest group to doing more in this area. I'd like to turn it back over to Walter now.

Thank you both.

Walter Frontera: Thank you very much, Judy and Marie and Consuelo, for great presentations and a great discussion. This will be the end of the open session, the public session, we're going to close that right now.