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HEARING ON ``NIH IN THE 21ST CENTURY: THE DIRECTOR'S PERSPECTIVE''

TUESDAY, JUNE 15, 2010

House of Representatives,

Subcommittee on Health

Committee on Energy and Commerce

Washington, D.C.

The subcommittee met, pursuant to call, at 1:11 p.m., in Room 2123 of the Rayburn House Office Building, Hon. Frank Pallone, Jr. [Chairman of the Subcommittee] presiding.

Members present: Representatives Pallone, Dingell, Gordon, Eshoo, Engel, Green, DeGette, Capps, Baldwin, Barrow, Christensen, Castor, Sarbanes, Murphy of Connecticut, Space, Waxman (ex officio), Shimkus, Whitfield, Pitts, Burgess, Blackburn and Gingrey.

Staff present: Bruce Wolpe, Senior Advisor; Ruth Katz,

Chief Public Health Counsel; Sarah Despres, Counsel; Robert Clark, Policy Advisor; Stephen Cha, Professional Staff Member; Virgil Miller, Professional Staff Member; Anne Morris, Professional Staff Member; Alvin Banks, Special Assistant; Allison Corr, Special Assistant; Emily Gibbons, Professional Staff Member; Lindsay Vidal, Special Assistant; Earley Green, Chief Clerk; Clay Alspach, Minority Counsel, Health; and Ryan Long, Minority Chief Counsel, Health.

Mr. {Pallone.} Good morning, or is it afternoon, I should say. We are having a hearing today and we are hearing from just one witness, Dr. Francis Collins, the director of the National Institutes of Health, and I think the members of the Energy and Commerce Committee are of course well acquainted with your great leadership that you have shown at NIH dating back to 1993 when you started your 15-year successful tenure as the director of the National Human Genome Research Institute. Your efforts as director of NHGRI resulted in discovering a number of important genes including those responsible for cystic fibrosis, neurofibromatosis, Huntington's disease, a familial and doctrine cancer syndrome, and most recently, genes for type 2 diabetes. And this work contributed to your being awarded the Presidential Medal of Freedom in 2007 as well as the National Medal of Science in 2009, the highest honor bestowed on scientists by the United States government. So we welcome your well-informed perspective today.

I just wanted to say that the outstanding biomedical research that NIH supports has had a transformative effort on our national health. U.S. life expectancy has dramatically improved over the past century as diseases once fatal have enjoyed scientific discoveries resulting in targeted,

effective and personalized treatment strategies. Patients once crushed by no treatment or toxic treatments of nominal value benefit from the collaborative, innovative work done by some of the world's best researchers here in Bethesda and all 50 States and in 90 countries around the world, and I am personally proud of the great partnership the NIH has with Rutgers University in my district as well as with the University of Medicine and Dentistry of New Jersey Medical School, which is the Nation's largest freestanding public health science university.

Now, we commend the progress NIH has made and cheer you on for the discoveries we know you will realize in the future. From Alzheimer's to autism to cancer to heart disease, we know that our federal dollars are hard at work. While I could go on in length about all the research you and your team are undertaking, I just wanted to mention a couple of examples. As you certainly are well aware, the war against cancer continues, and for good reason. Nearly 500,000 people die annually of the disease, but research conducted by NIH has resulted in the overall cancer rate decreasing and treatment is no longer reactive but proactively targeted to the genetic profile of each patient's cancer.

Further, NIH's collaboration with public and private

entities strengthens the global effort to fight infectious diseases. Antimicrobial drug resistance, which has been a subject of examination by the Health Subcommittee, is a top priority of NIH's National Institute of Allergy and Infectious Diseases. NIAID has shepherded basic research on resistance as well as facilitated partnerships with industry and nonprofit organizations to develop programs aimed at better controlling antimicrobial drug resistance. And just this week, NIH researchers announced the identification of two previously unknown steps in the spread of malaria in the bloodstream. Progress like this could have a profound effect on our global health, and today malaria kills over 1 million people annually, the majority of whom are young children in sub-Saharan Africa.

I wanted to say the Energy and Commerce Health subcommittee is proud of its long and productive relationship with NIH. We support the cross-cutting collaboration of researchers across disciplines and empower the NIH to continue to promote innovation in the bipartisan NIH Reform Act of 2006. We look forward to hearing an update today on the fully implemented Act including the work realized through the Common Fund.

Dr. Collins, if I could just take a minute, though, before I turn over to our ranking member, Mr. Shimkus. I

wanted to take a minute, if I could, from my colleagues' time or, you know, add to our time to thank a long-time member of my staff and the Energy and Commerce Health Subcommittee, Bob Clark or Bobby Clark. I always call him Bob and everybody else calls him Bobby. Would you stand up a minute, Mr. Clark? Most of you know him as being a staff member of the Health Subcommittee but actually he is kind of--I don't know--I guess the best example I have ever had of someone who actually walked into my district office as an intern at Rutgers University, worked as an intern, then was hired to work on the campaign, then worked as a staff person in the district office for a couple years, and then said he wanted to go to Washington, which I thought was a good idea. He came down to Washington, worked as a legislative person. Were you the receptionist before you even did that? I think he was even the receptionist for a while. And then he became a legislative assistant and then he went to Georgetown and got an M.A. in public health or health. Then he came back and worked as the legislative person on health care, and then finally went to the Health Subcommittee. Now he is moving on again. But I think he is probably--he may have been the only person who did absolutely everything, you know, from being the Rutgers intern all the way now to being on the Health Subcommittee staff. And you can't imagine the things I had

him doing, not just health care but Native American and everything else on earth, and he is also obviously a proud alumnus of Rutgers University. So I just wanted to take the time to mention that Bob is leaving at the end of this week and we wish him Godspeed.

[The prepared statement of Mr. Pallone follows:]

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Mr. {Pallone.} I will now yield to Mr. Shimkus, our ranking member. Thank you.

Mr. {Shimkus.} Thank you, Mr. Chairman.

Let me join you in wishing Bobby Godspeed in his new profession. He now gets to go into the private sector. He may become more Republican because of that, and I look forward to visiting with him real soon.

Thanks for the hearing. It is an important hearing. NIH is something that we all have said for numerous years is an important thing even when I first came here just doubling NIH funding which, you know, happened under Republican stewardship, was a big deal. We never have enough money for basic research and we always ask for more. So we are all very supportive of what can be done. We are particularly excited about, as the ranking member on the Health Subcommittee and even before that, the personal experiences of individuals with diseases of cancers. We are excited in this cancer genome atlas gastric cancer is now going to be included.

Everybody wants more money for every research facility but I do think that in this discussion of cancers if we focus on those that aren't cured right now or can't be delayed in doing the research like on the gastric survival rate, getting

people to survive, then we can move in a direction. So I know the committee was gracious in testimony we had earlier this year. That has been followed up by appropriation hearings. For Americans age 25 to 39, one's likelihood of being diagnosed with gastric cancer has increased almost 70 percent since 1977. So it is something, everyone has causes and that is one that we have been working on. So we will focus on that.

I am going to keep my opening comments short. We are concerned about the influx of cash in the stimulus bill and the 2-year focus because most of your stuff goes longer years than that and we are concerned about, well, what went well and what went poorly and because of the limited time frame.

I can't leave a health care hearing without talking about the new health care law. We were told it would save average premiums $2,500 a year. CBO says it is going to increase premiums $2,000 a year. But next week the new temporary high-risk pool program should go online, and informal discussions with some States, these high-risk pools are going to have to do something we said we weren't going to do. They are going to have to cap enrollees. They are going to have to create preexisting condition exclusion. Those are things we could fix if we would just talk about this new law and try to address some of the reforms.

So not as long as I normally go, Mr. Chairman. Thank you for your time and I yield back.

[The prepared statement of Mr. Shimkus follows:]

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Mr. {Pallone.} Thank you, Mr. Shimkus.

I yield to our chairman of the full committee, Mr. Waxman.

The {Chairman.} Thank you very much, Chairman Pallone. I thank you for this hearing. And I also want to pay tribute to Bobby Clark. While he was part of your subcommittee staff, he was part of the team working tirelessly on health reform. He was famous among the staff for his amazing command of detail and his calm-in-the-storm demeanor, and we will miss him and we all wish him well in his new endeavor.

For the hearing today, it is a great pleasure to have the new director of the NIH, Dr. Francis Collins, come and testify. He is a renowned researcher who among other scientific achievements led the government's effort to map the human genome. NIH is the preeminent health research institution in the world. It is recognized across the country and around the globe its outstanding work, and with good reason. The research NIH supports and conducts not only has resulted in cutting-edge scientific breakthroughs, it also led to real and meaningful improvements in public health.

But the work of NIH truly is never done. Even, as we learn more about disease and the human condition, the list of

research challenges grows. Some 40 years ago, for example, we thought of cancer as a single disease and now--it is much more complicated. Because of its outstanding work, we continue to look to NIH to help solve the trickiest of medical riddles such as Alzheimer's disease, diabetes, autism, spinal cord injury, Parkinson's disease and many others, and we also look to NIH to figure out how to prevent disease and disability wherever we can. Our job in the Congress is to ensure that NIH has the funding it needs for its researchers to continue their world-class work. Money is in short supply, I know, but federal support for NIH is not where we can afford to cut back.

In this time of both endless research possibilities, basic and translational, and difficult economic challenges, Dr. Collins has come forward to lead NIH and the brilliant researchers it supports. We are eager to hear from him about his plans and how best in the years ahead to meet NIH's mandate and continue the institute's longstanding legacy for making an immeasurable difference in the lives of all Americans. Thank you very much, Dr. Collins, for being here and to share your plans and priorities at NIH with us.

Yield back the balance of my time.

[The prepared statement of Mr. Waxman follows:]

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Mr. {Pallone.} Thank you, Chairman Waxman.

Next is the gentleman from Texas, Mr. Burgess.

Dr. {Burgess.} Thank you, Mr. Chairman.

Welcome, Dr. Collins, to our humble little committee.

I am going to submit my statement for the record and reserve time for questions because we rarely get a witness with this much firepower, and time is better spent for questions, so I will yield back.

[The prepared statement of Dr. Burgess follows:]

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Mr. {Pallone.} Thank you.

Our chairman emeritus, Mr. Dingell.

Mr. {Dingell.} Thank you, Mr. Chairman. I commend you for this hearing. I look forward to the result of it, and I ask to revise and extend my remarks. I have an admirable statement which everyone will enjoy reading.

[The prepared statement of Mr. Dingell follows:]

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Mr. {Pallone.} Without objection, so ordered, and any member may submit a statement and we will make it part of the record. Thank you, Chairman.

Next is the gentleman from Georgia, Mr. Gingrey.

Dr. {Gingrey.} Mr. Chairman, thank you.

The United States is a global leader in medical research and innovation, and we in large part have the National Institutes of Health to thank for these efforts. Today, roughly 30 percent of the funding for disease research equaling almost 3 percent of our gross domestic product comes from the NIH and our federal government. These investments have advanced our understanding and treatment of many life-threatening diseases. Recently, an NIH-funded organization at the University of Illinois-Chicago made national news when they reported finding key genomic markers common in autistic children. These findings may one day support our effort to understand what factors contribute to this disease.

Additionally, a dozen competing drug companies announced late last week that they would be taking the unusual step of sharing data on Alzheimer's disease. The hope is that this database of information created in consultation with NIH will spark news ideas for treatment of that grave disease. I would like to commend you, Dr. Collins, for helping to foster

this groundbreaking collaborative approach.

In addition to these efforts, NIH grants have resulted in the discovery and development of many lifesaving medical treatments. Since coming on the market, the combination of the drug Herceptin with chemotherapy has been shown to increase both survival and response rates for patients with breast cancer including reducing the risk of relapse by 50 percent when given to patients immediately following surgery. However, I do want to strike one note of caution. The drug Herceptin is widely available in the United States, but this was not always the case in Britain. England initially denied coverage of the drug and only relented after many public demonstrations including a protest march by thousands of women through the streets of London.

I raise these points because, as many of you know, Dr. Donald Berwick was recently nominated director of the Centers for Medicare and Medicaid Services by President Obama. This is the same Donald Berwick who just last year stated, and I quote, that ``the decision is not whether we will ration care. The decision is whether we will ration with our eyes open.'' To be frank, I fear that the groundbreaking treatments funded by NIH that we are celebrating here today will not be made available to our seniors if the political philosophies of Dr. Berwick are in charge of our Medicare

program. Mr. Chairman, our seniors cannot afford that, that kind of support of health care rationing.

I look forward, Dr. Collins, to hearing from you. We are honored with your presence.

Mr. Chairman, with that, I yield back my time.

[The prepared statement of Dr. Gingrey follows:]

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Mr. {Pallone.} Thank you, Mr. Gingrey.

Next is the vice chair of our full committee, the gentlewoman from Colorado, Ms. DeGette.

Ms. {DeGette.} Thank you, Mr. Chairman. I too will submit my statement to the record in order to have more time to ask the wide range of questions I have for Dr. Collins. We are glad to have him here.

[The prepared statement of Ms. DeGette follows:]

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Mr. {Pallone.} Thank you, and as I said, all members' statements will be submitted for the record.

Next is the gentlewoman from Tennessee, Ms. Blackburn.

Mrs. {Blackburn.} Thank you, Mr. Chairman. Thank you for the hearing, and I want to thank our witnesses for taking the time to be with us.

I will have to tell you that I am one of those that really enjoys watching the research that is taking place in my State of Tennessee. We have over 1,000 NIH research awards totaling over $440 million that were granted in 2009 alone. Tennessee organizations such as Meharry Medical, Vanderbilt University, St. Jude's Children's Hospital as well as several small privately held companies are making advances in the medical field that will improve the lives of everyone. Through the use of NIH funding, the Vanderbilt Institute for Clinical and Translational Research has pioneered many biomedical research advances including important discoveries regarding autism, diabetes and ADHD. Also, with the NIH funding, Vanderbilt Ingram Cancer Center is the only NCI-designated comprehensive cancer center in Tennessee that conducts basic translational and clinical research. Likewise, St. Jude's Children's Hospital in Memphis is using grant money from NIH to lead the way in cancer research and I

think we have all noted that St. Jude's was recently named the best children's cancer hospital in the Nation by U.S. News and World Report.

In addition to funding large research institutions, these NIH grants to small privately owned businesses throughout Tennessee such as Max Mobility, which is a small business of less than 10 employees located in Antioch, Tennessee, are producing great results. Max Mobility has used NIH funds to create innovative wheelchair designs and products to greatly assist regular wheelchair users and it is clear that research grants from NIH provide the opportunities for organizations to make and continue these discoveries.

In 2006, this committee passed the NIH Reform Act to cut bureaucracy, increase transparency and streamline interagency communication in order to increase efficiency and to hopefully decrease waste in the funding process. My hope is that we are going to continue on that path. My concern is that with the recent changes in the Administration and the passage of the health care bill that we are going to see a change in those matters.

So I am looking forward to the hearing today, and I yield back my time.

[The prepared statement of Mrs. Blackburn follows:]

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Mr. {Pallone.} Thank you.

The gentleman from Connecticut, Mr. Murphy.

Mr. {Murphy of Connecticut.} Thank you very much, Mr. Chairman. Welcome, Dr. Collins. In discussions beforehand, we realized that Dr. Collins spent some time in my hometown of Cheshire, Connecticut, and his kids actually went to the elementary school in our local neighborhood so it is good to see that it is a small world.

Dr. Collins, in Connecticut we have been wildly successful in the last 4 to 5 years investing in stem cell research lines. Due to federal restrictions, we passed the Nation's first law putting State funds into our two main research institutions of Yale and U. Conn. Yale has been able to leverage about twice as much in private investment money as public investment money due to these funds, and we are right now opening on the U. Conn campus an incubation center for spin-offs from the 40-some stem cell labs that we have at U. Conn today to move into private sector commercialized developments. It is very exciting but it presents our State, sort of new to the area of scientific investment, with some very interesting questions about how to match public and private partnerships and how to make sure that our State investment in some of the basic stem cell

research ends up with us sharing in some of the monetary gain to be happened through the commercialization of some of those partnerships.

And so whether it is in your testimony or in some of the questioning, one of the things that I am eager to hear about is how NIH continues to evolve in its thinking about how the scientific research that you fund when it becomes commercialized accrues to the benefit of the taxpayers that have made those investments. I know you are not a biotech venture capital firm. You are in this for the science of it and the lifesaving research, but I hope that we are constantly thinking as we are in Connecticut of new ways to protect taxpayer investments when it leads to a private sector solution that can reap large rewards to a private company even though it is based in part on federally funded research. We are thrilled that you are here. We are very eager to hear your testimony about the new and exciting things happening at NIH so we can bring your stories back to our constituents, and I appreciate the chance to ask some questions later on.

[The prepared statement of Mr. Murphy of Connecticut follows:]

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Mr. {Pallone.} Thank you, Mr. Murphy.

The gentlewoman from the Virgin Islands, Ms. Christensen.

Mrs. {Christensen.} Thank you, Mr. Chairman.

Although my opening statement is not as brilliant as our chair emeritus, I am going to submit it for the record, and I would like to welcome Dr. Collins.

[The prepared statement of Mrs. Christensen follows:]

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Mr. {Pallone.} Thank you.

The gentlewoman from Florida, Ms. Castor.

Ms. {Castor.} Thank you very much, Mr. Chairman, for calling the hearing, and welcome, Dr. Collins.

I think medical research in America today is very exciting, and the potential for continued breakthroughs and advances, the potential is unlimited, and in my hometown of Tampa where I represent a large research university, the University of South Florida, that is collocated with a premier cancer research institute in the Moffett Cancer Center.

All of these NIH awards are terrific. The grants are great, it improves the public health, but they are important for our workforce as well as we try to find our way out of economic recovery. What it means to our workforce needs and the potential for young people to have good-paying jobs in a profession that has a great future just cannot be understated.

So I am very interested in your testimony today about the future of NIH, how we can improve all the grant making that you do and provide young people with opportunities in this field and all the great opportunities that lie therein. Thank you very much.

[The prepared statement of Ms. Castor follows:]

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Mr. {Pallone.} Thank you.

The gentlewoman from Wisconsin, Ms. Baldwin.

Ms. {Baldwin.} Thank you, Mr. Chairman. I appreciate the fact that you are holding this hearing today, and Dr. Collins, I am very grateful that you are here today to share information about the vital role of the National Institutes of Health in our health care system and in our economy.

The NIH is especially important to my hometown of Madison, Wisconsin. It is the largest and most critical source of research funds for the University of Wisconsin-Madison which in my own unbiased opinion is one of the word's premier research institutions.

Basic and applied medical research has and will continue to have a significant impact on the health of Wisconsin's residents and the State's economic growth. Biomedical research has helped raise the average life expectancy of Wisconsin residents from 52 years in 1920 to 79 years in 2005, and every year Wisconsin citizens save an estimated $1.6 billion in health care costs, thanks to public investments in biomedical research and development. And finally, Wisconsin researchers bring in a greater percentage of federal bioscience funding per capita than any other federal program or expenditure in the State generating

thousands of high-quality, high-paying jobs for our residents.

And I want to add just a little personal note. As somebody who was raised by her grandparents and having one grandparent who was a biochemist, I was certainly personally raised off NIH funds, so I have a personal debt of gratitude to the NIH and the grants. NIH grants have trained students and created jobs. They have fostered significant scientific progress and saved lives.

Yet certainly challenges lie ahead. Budget constraints and limited funding for infrastructure improvements restrict the capacity of research institutions to take biomedical research to the next level, and we must nurture young researchers and ensure that the next generation of scientists stays in the field.

So I look forward to your testimony, Dr. Collins, and thank you for being here today, and Mr. Chairman, I yield back the remainder of my time.

[The prepared statement of Ms. Baldwin follows:]

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Mr. {Pallone.} Thank you.

Next is our subcommittee vice chair, Ms. Capps.

Mrs. {Capps.} Thank you, Chairman Pallone, for inviting Dr. Collins to testify before us today, and thank you, Dr. Collins, for joining us here. I have been waiting for this occasion, and I will take less than a minute just to say this is really about us listening to you, about the fascinating work being done at the Institutes now, the direction you would like to take the Institutes into the future and how Congress can best legislate the authorities for you to meet your goals which are our goals as well.

Most importantly, how can we keep up with the pace and the direction of scientific discovery? How can we move to more quickly translate those discoveries into practice, both in treatment and in prevention? I bring up prevention because so often we think about basic research that leads to the development of chemical drugs, biologics, medical devices, but there are also very many opportunities to nip disease in the bud, to diagnose more efficiently and more quickly, and to prevent diseases before they ever develop.

So I look forward to hearing from you. Thank you very much.

[The prepared statement of Mrs. Capps follows:]

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Mr. {Pallone.} Thank you. I think we have had every member of the subcommittee do an opening statement so we will move to you, Dr. Collins. And let me say to the members that Dr. Collins had asked to speak longer than usual. I don't know if it was 12 or 15 minutes, something like that, and I said fine, because he is our only witness today and I think he needs some extra time to basically develop his testimony. So with that, we welcome you and thank you.

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^STATEMENT OF FRANCIS S. COLLINS, M.D., PH.D., DIRECTOR, NATIONAL INSTITUTES OF HEALTH

} Dr. {Collins.} Thank you, Mr. Chairman, and thank all of you for those wonderful opening statements. It is clear I am speaking to a very well-informed group of members. I have been looking forward this chance for a conversation for some time and will very much enjoy the questions, and hopefully some answers that occur after a little bit.

But I did want a chance to say something in the way of a introductory set of remarks about NIH. It is a great honor to have a chance to share my vision for the future of biomedical research as we move into the second decade of the 21st century. I have submitted my full written testimony for the record, and I am not going to read from that. I would like to share with you some major themes that were in that statement, and I have a few visuals that will appear up there on the screen.

So I would like to thank this committee for your steadfast support of NIH's mission, which you see here on the slide is twofold: to discover fundamental knowledge about the nature and behavior of living systems, yes, but also to apply that in extension of healthy life and the reduction of

the burdens of disability and illness, and has as already been pointed out by a couple of you in your opening statements, we are making real progress there. As you can see, U.S. life expectancy has been climbing over the course of the past few decades, and if you look at disabilities, those also have improved substantially in the course of just the last few years. You can see here the incidence of disability in the elderly has dropped from more than 25 percent back in 1982 to now less than 20 percent. But let me emphasize that human biology is not an end to itself. We wake up every day trying to think about how to further improve those outcomes.

Right now, of course, one of the most urgent goals that everyone is concerned about relates to the BP Deepwater Horizon oil spill. This is an environmental tragedy of unprecedented proportions. For the past several weeks, NIH has been partnering with our sister agencies in the Department of Health and Human Services to protect the health and meet the medical needs of Gulf residents and cleanup workers. For example, the National Institute of Environmental Health Sciences has provided training and safety information to protect the health of responders. Its educational course on hazard awareness and safety is now required for all oil spill workers hired by BP. More than

30,000 to date have been trained by NIEHS including the distribution of a safety handbook. I have a copy here that has been distributed to first-line responders and beach workers.

But we have to do more here, and so today I am announcing that NIH will devote another $10 million in existing funds to support research on the potential human health effects of the oil spill. NIH through NIEHS will recruit a cohort of 15,000 to 20,000 exposed cleanup workers and Gulf residents. We will collect their health histories and tissue samples as well as information about cleanup work they performed and the nature of their exposures. In the near term, NIH will establish a baseline of such information and then we will monitor cohort member for respiratory, immunological and neurobehavioral effects. So that is an example of some urgent responses, and we do feel that is part of our job, to respond to those as they arise.

But we also have to look ahead to tackle our Nation's many ongoing health problems: obesity, cancer, heart disease, diabetes, autism, to name just a few, and you all in opening statements have mentioned quite a number of these. One of my first actions upon being named NIH director was to scan this landscape of biomedical research opportunity to try to identify areas that are really ripe for major advances

that could yield substantial benefits in the coming years, and while that list of specific projects could go on forever, I have identified five areas with exceptional opportunity. At your place, there is a reprint of an article in Science magazine and I would like to very briefly tell you what these five themes are that seem particularly ripe now for investments by NIH researchers, and I will go through them one at a time.

First of all, we have seen invented in just the last 4 or 5 years a number of dramatically powerful high-throughput technologies that give us the chance to ask comprehensive questions about how life works, what are all the proteins in the cell, what are all the components of the immune system, what are all the steps in development. We couldn't really ask those questions before and now with technologies like genomics and imaging, computational biology, nanotechnology, we can do those things, and the chance to apply them is really unprecedented in its scope.

A second area that I think is a natural partner to this is to take all those basic science discoveries that are beginning to pour out of our laboratories and accelerate the pace by which those are brought into clinical benefits. NIH traditionally has partnered with the private sector in doing this, and we intend to continue that, but we have the chance

now to play an ever-larger role in the front end of drug development pipelines that previously academic investigators didn't get involved in, and we aim to try to push that agenda as quickly as we can in order to take basic science discoveries to the bedside at an unprecedented pace, and by the way, I might say the Common Fund, by the NIH Reauthorization Act, putting it into legislation, is now a major opportunity for me as the NIH director will be investing substantially in both of these areas in the coming years because this is an example of the kind of research that touches on all diseases. It is not limited to any single institute.

A third area is for us to try to provide the kind of evidence that is going to be needed to make wise decisions about health care reform, and that includes things like personalized medicine, pharmacogenomics, comparative effectiveness research. It includes health economics to try to understand how we can better figure out incentives that will both improve outcomes and result in better care.

And at the same time, we also need to think about, and the fourth theme, extending outside of our own boundaries to the rest of the world. We have opportunities in the global arena now to both create and deploy new kinds of diagnostics and therapeutics for AIDS, tuberculosis and malaria and for

the neglected tropical diseases that have had relatively little work done upon them but they affect hundreds of millions of people.

And finally, the fifth of the five themes is our own research community, probably our most critical resource. We certainly will depend upon these wonderfully bright minds in order to make these discoveries in the coming years and we need to be sure that we encouraging the best and brightest of the next generation to come and join us, that we are inspiring innovation and not just crank turning, that we are improving the diversity of our workforce, and I might also say that we are encouraging and stimulating and insisting upon the integrity of the process to be at the highest level.

Let me just say a word about that. In the process of overseeing NIH research, one of my priorities to be sure that we are vigilant about managing any potential conflicts of interest or even the appearance of such conflicts. I am determined that NIH should lead in this area, and that is why we are in the midst of proposing a new set of regulations that will require more complete disclosure from NIH-funded investigators about their dealings with industry in order to maintain the public trust. The need for enhanced trust of financial conflicts of interest has been made particularly salient by the news last week that described a particularly

egregious case of failure of an investigator to disclose. In this case the scientist was sanctioned by his university but then went on to move to a new university and thus evaded the sanctions. We are going to fix this problem. The pending notice of proposed rulemaking about conflicts of interest gives us an opportunity to address cases where there are such violations of NIH and university financial disclosure rules. We can clarify our options for enforcement actions against both individuals and institutions. So I am committed to making sure that we earn the public trust and ensure the highest standards of research integrity and transparency.

Now I want to go on to share several exciting examples of how NIH-funded researchers are using some of these revolutionary tools and technologies to expand our understanding of human biology. The more we learn about how the body works, the greater our ability to transform that knowledge into cures and treatments for the many diseases that plague humankind.

Alzheimer's disease has already been mentioned. Currently, more than 5 million Americans suffer from this degenerative brain disorder, and with the aging of the American population, that number could more than double by 2050 and would greatly increase the disease's already steep financial toll. If current trends continue, the annual

health care costs associated with Alzheimer's disease would rise from $172 billion to more than $1 trillion over the next 40 years.

Now, because Alzheimer's disease has proved to be such a tough opponent, researchers are now attempting to fight it on many fronts, and the first prong of attack is an interesting one that might not have seemed obvious a couple of years ago, and that is immunotherapy. This involves enlisting the body's own immune system to prevent the accumulation of beta amyloid, which is the protein thought to be a major culprit in Alzheimer's disease. About a decade ago, there was much excitement about a clinical trial of the vaccine but enthusiasm flagged when some participants developed brain inflammation, obviously a serious side effect. Since then, much work has been devoted to figuring out ways to improve the safety profile of such vaccines. One new approach which combines immunotherapy with anti-inflammatory agents has produced encouraging results so far in animal tests. Other recent work by NIH-funded researchers has uncovered a possible new drug target for Alzheimer's disease and one which interestingly brings this disease into closer molecular harmony with Parkinson's disease and with Huntington's disease and a few others. In a study just published last week, researchers describe how a particular gene that is

associated with Alzheimer's, presenilin 1, acts to cause this disorder, and interestingly, what they learned was that this protein normally helps clear debris from the brain but mutations block the normal plan for the trash pickup system in the brain, leading to a potentially toxic accumulation of discarded proteins. We already know of a few drugs that would stimulate the trash pickup, and this is raising new ideas about an approach to Alzheimer's that people have not thought about before.

A third effort, and this is a public-private partnership, is the Alzheimer's Disease Neuroimaging Initiative, which is combining various clinical neuroimaging, genetic and spinal fluid measures to understand the events that lead from normal cognition to Alzheimer's disease to finding biomarkers. Such data have been rapidly made available to the worldwide research community and now thanks in this case to an infusion of Recovery Act dollars from NIH, this initiative, ADNI is stepping up its efforts even further.

I also want to talk about cancer. Several of you have mentioned it already. A major project that has been accelerated by Recovery Act funds is this cancer genome atlas, or TCGA. Already, TCGA has produced comprehensive molecular classification systems for ovarian cancer and for

glioblastoma, which is the most common form of brain cancer and a very serious one. The team survey of glioblastoma recently revealed five new molecular subtypes of the disease that we didn't know existed before. In addition, researchers found that responses to therapy for glioblastoma vary by subtype and that may help doctors do a better job of matching individual patients with the therapies are most likely to work for them. What is more, the findings may lead to new therapies directed at the molecular changes underlying each type of glioblastoma, providing targets that we very much need to have in order to develop the next generation of therapy.

So now in the next phase of the project, again encouraged by the Recovery Act, TCGA will build comprehensive catalogs of the key genomic changes in 20 major types and subtypes of cancer including gastric cancer. These data are being shared rapidly with the worldwide scientific community and will provide powerful new clues for all who strive to develop better ways to diagnose, treat and prevent cancer.

Those are general stories, but to give you a real-life example, I would like to share the story of Beverly Sotier. When she was diagnosed with stage IV non-small-cell lung cancer several years ago, this nonsmoker was told she probably had 6 months to live. Beverly received standard

chemotherapy but her tumors kept growing. Devastating news for her and her children and grandchildren. But then last July based on a genetic analysis of her tumor at the Dana Farber Cancer Institute in Boston, she signed up for a clinical trial of a new genome-based drug called crizotinib. Now, look at the scans. It may be a little hard to see where you are but maybe the red circles will help you, but if you look on the left in both of those images, her lungs, the black areas, have big white spots in them. Those are large tumors growing in her lungs. On the right is after treatment some 5 months later, and those tumors are essentially gone. So she has had a dramatic result, and in the first 6 months of treatment most of her tumors have disappeared.

But this doesn't work for everyone. This particular drug actually seems only to be successful for about 5 percent of people with lung cancer, but we know now which 5 percent because, you see, this drug works on specific genomic changes called a fusion of a gene called ALK with another gene. If your lung cancer has that fusion, this is the drug for you because most of those patients, about three-quarters of them, respond dramatically to this new therapy. This was just announced a few days ago at the American Society for Clinical Oncology. People in the room were blown away by this kind of response and by the ability to make such a precise prediction

about who was going to respond. So this demonstrates the potential of personalized medicine, of the value of matching the right treatment with the right patient at the right time.

Interestingly, Beverly's story also points out rapidly this can happen. When she was first diagnosed, nobody knew about this genomic change in lung cancer. That was discovered just 3 years ago and now here she is showing this dramatic response to a new drug. So it need not be the case that the new therapeutics take many, many years. Clearly, we need a lot more stories like Beverly's, not only for cancer but for asthma, diabetes, depression, heart disease and many other conditions. The brochure you have at your place outlines some of those exciting advances.

So it is my hope and my expectation, Mr. Chairman, that NIH-funded research will bring us much closer to turning discovery into health for all Americans and to do so quickly. If our Nation is bold enough to act today upon the many research opportunities that lie before us, I believe we will all be amazed at what tomorrow brings.

Thank you very much, and I would be glad to answer your questions.

[The prepared statement of Dr. Collins follows:]

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Mr. {Pallone.} Thank you, Dr. Collins, and we are going to have members ask questions now. Some have 5 and some have 8 if they didn't do an opening statement, and I will start with myself for 5 minutes.

Dr. Collins, I am just regularly visited as you can imagine by families and advocates with very compelling stories about diseases they have grappled with, and of course the message almost always is, please increase NIH research for, you know, the particular disease and particularly of course during the appropriations season, and of course, every one of us has had one disease that may have had a profound effect on our lives either personally or our families. The reason I bring that up is because many of us believe that we should allow science and the public health, not politics, obviously, to determine the research priorities of NIH, and I think that generally speaking, that is true, and that has been the case. But to be sure, there are times when the relationship between national spending, science and public policy have to be considered. Some diseases like Alzheimer's, for example, are responsible for a massive strain on our Medicare and Medicaid programs. Other developmental disabilities like autism have a significant effect on our families from a very young age and on our

school budgets and social services programs. Obesity, for example, is skyrocketing and has a major economic impact and is responsible for loss of productivity, restricted activity, absenteeism. The point I am trying to make is that it is difficult because many times the effects of some diseases or disorders has a huge impact on the economy and the question of how much we spend and how many dollars are lost, so it is hard to completely take out funding and politics from the scenario. But what I wanted to ask you is, what factors you consider when formulating NIH budget and how can we best work with you to ensure that NIH is maximizing its research dollars. Do you think that, you know, perhaps we are being too--you know, that we are not giving you enough input or perhaps the way we are going about prioritizing things needs to be changed?

Dr. {Collins.} Thank you, Mr. Chairman. This is certainly an issue that at NIH we discuss probably just about daily, are we getting our priorities right. The factors that go into that are numerous and they do change over time. Certainly the burden of a disease has to be a major consideration. I mentioned Alzheimer's in my opening statement particular because of the concern about the burden this disease places on people today and that it may place on people tomorrow, and if we certainly need breakthroughs in a

disease, Alzheimer's is near the top of that list. Sorry, I seem to have a disease myself today. I am trying to struggle with the aftermath of some sort of respiratory virus.

So certainly the burden is one factor, but if we only studied common diseases that affect hundreds of millions of people, then what about the rare diseases? If a rare disease strikes your family, it probably doesn't matter to you too much that it is rare. You hope that somebody will be doing something for that. Gastric cancer was mentioned, which is growing in its frequency and we don't know why, but it is still a rare cancer. Should we ignore it and just study the common cancers? That doesn't sound right either.

Then of course, there is the matter of scientific opportunity. In a circumstance where there has been a new realization of opportunity to make a real advance in a disease, even if that is not as common as a different disease, you wouldn't want to pass that up, so that folds in there. Fortunately, peer review, which NIH does probably better than any organization in the world, is one of the ways of trying to make sure we are using our investment wisely, and we do have a two-level peer review system. The first level is to look at scientific excellence of a proposal but the second level looks at program needs, and there again that is an opportunity for our experts to come to our advisory

councils from universities and companies all over the country and sometimes the world to give us advice about should you steer your ship a little bit further in this direction or the other.

The other thing I should say is that basic science not attached to any particular disease is also a critical part of our portfolio and needs to be so because that is the foundation upon which we build the future, and if we solely made decisions on the basis of diseases, we might miss out on those important investments. I guess what I am saying is, it is a very complex calculus and it should be, but I do think it is best made by people who have a sense of the entire landscape. I am sympathetic with what must happen to you every day when someone with a very compelling story where more resources clearly would help in terms of the advances that are needed in research is asking for your help because I have those same conversations all the time, and obviously more resources in many instances would help but we have a limited opportunity here in terms of the budget, the resources that the taxpayers are willing to give us. I do think the best plan is for those decisions to be made on the basis of science, and I think at NIH, not just speaking for myself but for those 27 institute and center directors and all the advisors we have with all of their expertise, I think

we do a pretty reasonable job.

Mr. {Pallone.} Thank you very much.

Mr. Shimkus.

Mr. {Shimkus.} Thank you, Mr. Chairman. First I would like to ask unanimous consent that we can submit this letter into the record. It is a very historic letter because it is a letter signed by Senator Durbin and myself, and you will not see these letters signed on a similar issue. It is on gastric cancer, as was mentioned by Dr. Collins.

Mr. {Pallone.} Historic because Dick Durbin signed it? Is that what you mean?

Mr. {Shimkus.} We both signed the same letter. That is why it is historic.

[The information follows:]

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Mr. {Pallone.} Oh, I see. Without objection, so ordered.

Mr. {Shimkus.} Thank you, Mr. Chairman, and welcome.

I want to commend NIH's commitment and emphasis on this translational research and to give basic researchers a tool to covert their discoveries into therapies for patients. This, I believe, is one of the most important parts of the research, that part that makes a difference in patient survival. How do you hope to expand NIH and NCI's work in this area?

Dr. {Collins.} So if the question is about the basic part of cancer research, I think we are at a remarkably exciting time in terms of our understanding of what makes cells grow and what makes them stop growing, and really that is the nature of cancer, is the loss of control that a cell normally has. When you see cells that have lost that control, even in their proper location or worse yet, if they have spread to other parts of the body, that is a malignancy. We have learned a lot in the last 10 or 20 years about the signals that control the on and off switches for cells but we have a lot more to learn there. I am particularly delighted to welcome on July 12th the new director of the National Cancer Institute, Dr. Harold Varmus, who will be coming back

to NIH after 10 years after president of the Sloan Kettering Cancer Center in New York and Nobel laureate as he is, and somebody who won his Nobel Prize in this very area, and I think it could hardly be a more exciting time for exploring and finding the additional answers we don't know about yet in terms of the basic understanding of cancer, and that is going to shine a bright light on prevention and treatment strategies.

Mr. {Shimkus.} Great. Thank you. My time is limited. Let me go to--in my opening statement I mentioned in the stimulus bill but also just regular funding the 2-year program versus a 4-year program, and how does that help or how does that hurt, and the real question is, would it have been better in the stimulus bill had we went to longer-term strategies and in the remaining stimulus dollars that haven't been spent would you like the opportunity to be able to shift that to longer-term research programs that you have?

Dr. {Collins.} I appreciate the question. Certainly the availability of support from the Recovery Act was a wonderful opportunity for NIH. We had gone through a 5-year period where the budget had been relatively flat, and that meant inflation had been eroding our buying power to the point where we had lost about 16, 17 percent of our purchasing power, and there was a great pent-up interest and

need on the part of the scientific community for new resources to spur innovation. So the availability of those dollars from the Recovery Act resulted in an incredible outpouring of grant applications. One particular kind of application that we designed very quickly and put out there for people to respond to called Challenge Grants. We thought we might get 4,000 or 5,000 applications. We got more than 20,000, and it took quite a lot of work to get the reviews done and decide what we could fund. So clearly there was a need, and I would argue that the dollars that came to NIH from the Recovery Act are extremely well spent. They are going to produce very interesting scientific advances. But you are quite right, that 2 years is a very short cycle time for most scientific projects. I understood, and I think all of us did, why that was the case. We were, after all, and still are in an economic downturn of considerable magnitude, and the point here was not just to do great science but also to encourage job creation and to stimulate the production of goods and services, and I think NIH money has done that really quite remarkably well, 50,000 jobs--

Mr. {Shimkus.} My time is running out, but can you address the remaining stimulus dollars and putting it to longer-term prospects?

Dr. {Collins.} So we have essentially allocated all of

our $10 billion. We were given a chance for a few of those dollars to be put into multi-year projects but most of them are in 2-year efforts.

Mr. {Shimkus.} Let me just find an end with this. There is an NIH-funded study called Changing Lanes, Changing Times: The Risks Facing Female Drivers Today. Isn't that better a NHTSA study versus an NIH study? So the question is, what is the process by which you decide to do NIH-funded research that probably should be a NHTSA one versus what you have decided? And it is not an insignificant amount of money. For 2009, it was $7,000 but $260,000 for 2008. So it is a pretty big chunk of change.

Dr. {Collins.} So Mr. Shimkus, I am not familiar with that particular grant. The process we follow--

Mr. {Shimkus.} I think the best way is if you could just come back and give me a response to that later on, I would appreciate it.

Thank you, Madam Chairman.

Ms. {DeGette.} [Presiding] Dr. Collins, could you also provide this committee with a copy of the slides that you showed today? Our aging eyes had difficulty seeing over there.

Dr. {Collins.} I would be delighted to, yes.

Ms. {DeGette.} Thank you.

The Chair will recognize Chairman Dingell for 8 minutes.

Mr. {Dingell.} Thank you, Madam Chairman. I have a great concern about how NIH addresses its investments in research. We have several considerations that go into this. The first is that some diseases impose an enormous fiscal burden on Medicare, Medicaid and the American people. For example, Alzheimer's costs three times as much to Medicaid as other chronic diseases. In Medicaid, it costs nine times as much. So you have the cost component. Next you have the good scientific approach. In other words, which is best to go into from the scientific standpoint. And then there are some other considerations, one of which is we confront the problem of the deep concerns of people who have this as a part of their experience, the disease. And how do you prioritize stopping of high-cost diseases like Alzheimer's and how do you mix these concerns?

Dr. {Collins.} So Mr. Dingell, I think that has been one of the strongest mandates that I as the NIH director and the other 27 institute and center directors share is the need to look at those priorities and to try to balance those considerations between the burden of the disease, which means how serious is it, how many people does it affect, what is its cost to society, what is its personal cost to the individual and to the family but also factor into that the

scientific opportunities which may in some instances be more ripe than in others. As I said earlier, I think that we also have to be sure we are not neglecting those rare diseases which are in many instances opportunities not only to help people who are suffering from a condition that might otherwise be a bit neglected but often shed light on common diseases. We would not, for instance, right now have the statin drugs had not been for the study of a rare disease called familial hypercholesterolemia that Brown and Goldstein, who later won the Nobel for this, figured out this whole pathway that led to the discovery of statins.

Mr. {Dingell.} Do things like we have done with regard to viruses and genetic research which enabled you to address the questions that would lead us, for example, to a cure for polio. But let us come back. How do you prioritize addressing diseases like Alzheimer's and how do you balance this against the scientific opportunities and how at the same time do you deal with the problems of getting the biggest bang for your buck while at the same time doing the best job we can in areas? And to come back to Alzheimer's, what about the situation? How much are we putting into Alzheimer's and how are we evaluating what we are doing there?

Dr. {Collins.} So Alzheimer's disease is particularly an emphasis at the National Institute on Aging but several

institutes at NIH invest in Alzheimer's research. In 2009, $534 million of NIH money was put into this, and that includes $77 million from the Recovery Act, and that included a wide range of research investigations from such things as the ability to understand the genetic contributions to Alzheimer's going beyond the well-known APOE e4 to other variants that have now been demonstrated as playing a role to new imaging approaches that allow us to assess whether a treatment is working without having to wait years to see if that is the case, biomarkers of response to therapy to immune therapies which are actually looking quite promising as a way to potentially reduce the formation of these beta amyloid plaques to new ideas that suggest maybe a new drug therapy approach. There are 30 drug trials that are either in place or getting ready to go into action in terms of Alzheimer's approaches. So there is a lot of activity here but I share the sense that this is a time bomb. I mean, it is already upon us but it is going to get worse if we don't come up with better strategies for prevention and treatment in the future.

Mr. {Dingell.} Let us talk here about cooperation and collaboration with other agencies, which you just mentioned. FDA plays an integral role in the translating basic discoveries into new diagnostic and treatment advances in the clinic. There has to be both a smooth transition and it has

to work between discovery and FDA analysis. The Administration is recognizing this and they are recognizing we can do a better job in biomedical research planning and regulatory review of newly discovered therapies. How do you feel this will provide the needed predictability for industry as they make investment decisions?

Dr. {Collins.} Very important question, Mr. Dingell, and certainly from my perspective, the need for close connections between NIH and FDA has never been greater. Accordingly, Peggy Hamburg, the commissioner of the FDA, and myself have established an NIH/FDA leadership council and we had a public input meeting just 10 days ago to see what issues that council might take on, and we have begun a scientific research effort in regulatory science to try to give the FDA some new tools to be able to do review of new and creative research clinical trials in order to speed up the process of assessing whether truly new approaches are safe and effective. I think it is timely indeed to have those kinds of opportunities brought forward, and I think industry is welcoming the way in which Dr. Hamburg has brought the idea of regulatory science into the present time in order to try to handle some of these more creative approaches to design and testing of new therapy.

Mr. {Dingell.} Now, I have a further concern here. We

have put some money into health reform research tax credits. The new health reform law provides tax credits to support biological research and biomedical research for small firms, something which you know rather much about from your time at University of Michigan. How helpful do you think this tax credit is going to be in producing new therapies and in addressing unmet medical needs?

Dr. {Collins.} So this is the program called the Qualifying Therapeutic Development program which is supposed to make it possible for biotechnology companies with less than 250 employees to be able to get a tax credit if they are involved in therapeutic or other clinical advances in medicine. I actually think this could be a very useful program at a time where many of these companies are really starved for capital. With the economy in its downturn, venture capital has been hard to come by and so this is a chance for companies that have projects that have stalled for lack of support to be able to obtain tax credits or grants to get those things going again.

Dr. {Collins.} Doctor, there are two questions I want to get in the record here. Why is it important that this credit be targeted to smaller biotech firms, and second, how will the applications be prioritized amongst diseases and amongst the hopefulness of a particular treatment or a

particular firm?

Dr. {Collins.} I think the goal particularly was to try to provide relief for small companies who have been dependent on venture capital that is no longer easy to come by. Hence, the reason for small companies. As far as the prioritizing, NIH has been asked to do the reviews of the applications and we have welcomed the chance to do that. We will prioritize on the basis of the likelihood of success of particular projects and the importance therefore of providing additional financial resources to make that happen.

Mr. {Dingell.} Thank you, Doctor. My time is up.

Thank you, Madam Chairman.

Ms. {DeGette.} Mr. Gingrey.

Dr. {Gingrey.} Madam Chairman, thank you.

Dr. Collins, let me ask you a couple of things. You mention in your testimony the promise that high-throughput technologies--that was one of the bullet points on the slide--high-throughput technologies hold for our understanding of the causes of many diseases and new pathways for potential treatment. Can you explain what high-throughput technologies are and how this technology might benefit our health system?

Dr. {Collins.} Certainly. Thank you for the question. High throughput is essentially referred to new approaches that understanding how life works in a cell, usually a human

cell, where you don't just look at one protein at a time or one gene at a time or one metabolite at a time. You are trying to look in a very rapid fashion at a very large amount of data. Genomics is one of those high-throughput technologies where we used to satisfy ourselves with focusing in on a single gene that caused, for instance, sickle cell disease, but now we can sequence the entire genome, all 3 billion letters of the code in the space of about a week. That is high throughput. Now, that is a challenge then to be able not just to generate the data but to make sense of it, so another part of high-throughput technologies is a lot of computational needs so that marriage of biology and computers, which has been coming along for a while, is now really fully underway and a very productive marriage it is indeed.

Dr. {Gingrey.} Thank you, Dr. Collins. Let me go back to in a way something that Chairman Emeritus Dingell was talking about in regard to how you make the decision on what to fund, and I think the gentleman from Connecticut and the gentlewoman from Tennessee both mentioned about job creation and that sort of thing. When an application is going through the peer review process, how much weight is given to the number of jobs that the grant will support in contrast to, say, what Chairman Emeritus Dingell was talking about

Alzheimer's and the significance of that disease on the cost to our overall health care system? How do you balance that?

Dr. {Collins.} So our primary reason for doing that first level of review is to look at the excellence of the science. We want to be sure we are supporting the very best scientific ideas. The second level of review then really looks at program relevance and balance and may very well take some account then into what kind of project is this and how many people would be supported. But frankly, the difference between the types of grants that we would support in this process in terms of how many jobs they would create is not going to be very huge. Most of this will be defined by the dollars that are being invested in research because in general about 30 to 40 percent of our research dollars are going to support the salaries, the jobs of the individuals doing the work. And so whether we pick this grant or that grant--

Dr. {Gingrey.} I am sorry. What percentage?

Dr. {Collins.} Thirty to 40 percent, somewhere in that neighborhood of what we are spending in terms of our direct costs are generally--

Dr. {Gingrey.} The personnel involved in the research?

Dr. {Collins.} Exactly. The average grant that we give out supports seven jobs.

Dr. {Gingrey.} Well, the reason I ask that question, I spent 6 years on the House Armed Services Committee and was a strong, strong advocate for the F-22 Raptor. Now, it happened to be finally assembled in my Congressional district and it involved at least 2,000 jobs, and whenever I advocated on behalf of that program, I think I was rightly challenged to justify my support based on air superiority and the defense of the country and not just jobs that would be created in my Congressional district. And again, I think it is the same thing in regard to this and that is why we ask these questions. We all love to see our great research universities like in Georgia, I will mention Georgia Tech first because that is where I went to school, but the University of Georgia as well and the Medical College of Georgia and my hometown of Augusta, Georgia, all these institutions are absolutely fantastic and have great research programs and I hope to see them continue to utilize NIH grants in a way that will foster hopefully the cure of diseases like Alzheimer's and, you know, maybe this business as you mentioned beta amyloid plaque prevention by vaccination. I think that is very exciting.

I know you have got a huge challenge, Dr. Collins, and we wish you well and the wellness of the country of course is dependent on the research that is being done directed by you

and these 27 institutions in NIH. So we thank you for being here, and I will yield back my time, Madam Chairman.

Ms. {DeGette.} The Chair recognizes herself.

Dr. Collins, it has been almost a year now since the NIH approved the final guidelines for human embryonic stem cell research. What is the status of the embryonic stem cell research being funded by the NIH?

Dr. {Collins.} Well, I am happy to say that has resulted in a significant set of advances in terms of both stem cell lines that are available now for federally funded researchers and for new projects that NIH has funded with that new capability that the President's executive order has made possible, and in fact, as of now there are 73 human embryonic stem cell lines that have gone through our very careful process to make sure that they have been collected with the most stringent kind of ethics involved in the informed consent and are now available for federally funded researchers to use, and they are all listed on the registry that NIH has put up for investigators to look at.

Ms. {DeGette.} Are there additional cell lines that are waiting for approval, Doctor?

Dr. {Collins.} There are more than 100 other lines that either already have their applications complete and they are in the process of being reviewed or have started the

application process and the investigator who is going to submit has not quite finished supplying all of the data. So this number is going to continue to grow in a very gratifying way.

Ms. {DeGette.} And what is the budget, the NIH budget being spent right now in stem cell research?

Dr. {Collins.} So for fiscal year 2009, in terms of human embryonic stem cell research, the total comes to $148 million--I am sorry--$119 million, and that does not include some additional ARRA funds, a total then for ARRA funds in human embryonic stem cell research of another $22.5 million.

Ms. {DeGette.} So that was in fiscal year 2009?

Dr. {Collins.} Right.

Ms. {DeGette.} Has that increased in--

Dr. {Collins.} In fiscal year 2010, which we of course are still in the middle of so I can't give you exact numbers but I believe that is going to be higher because we have had a lot of new applications as a result of the availability of these new lines.

Ms. {DeGette.} Okay. Do you think that the scientific community would benefit from knowing that the ability to conduct this type of human embryonic stem cell research would be codified versus just contained in an executive order?

Dr. {Collins.} So I appreciate the question. I think

the executive order has provided the scientific community with a great deal of excitement in terms of the ability to begin to do experiments that were previously not allowable. Whether that would be further increased in terms of confidence about the future by having this codified in legislation is not something I am probably in a good position to be able to comment upon but I understand--

Ms. {DeGette.} Let me ask you this question then, because what I hear from a lot of the researchers is oftentimes these research projects because they are basic scientific research take a number of years to complete. Would that be correct, to your knowledge?

Dr. {Collins.} Yes, and researchers would certainly like to be confident that their particular experimental approach can go forward without risks of somehow being no longer allowable.

Ms. {DeGette.} I mean, some of these projects people tell me can take 5, 6 even more years to complete.

Dr. {Collins.} Science is a marathon, not a 100-yard dash. You are quite right.

Ms. {DeGette.} Yes. Okay. And I also want to ask you, in November 2007 scientists were able to successfully revert human adult skin cells into an embryonic-like state because they inserted a retrovirus. Those resulting cell lines, as

you well know, are called induced pluripotent stem cells, or iPS cells. I would like you to tell me about what progress has been made in the iPS research and is this something that the NIH is also funding?

Dr. {Collins.} Absolutely. I have to tell you, Congresswoman, when I read Shinya Yamanaka's paper in 2007 describing how he had been able to take a skin cell and by adding just four genes to it cause it to essentially go back in time and become pluripotent, the hair stood up on the back of my neck. It was one of those moments where you realize this is a publication that changes everything. Who knew it was going to be that possible? So yes, the potential here because you could then produce pluripotent cells from any of us that would therefore be possible to use in the future for therapeutic purposes without rejection.

Ms. {DeGette.} Because they would be a genetic match?

Dr. {Collins.} It would be a match.

Ms. {DeGette.} Now, to date, let me ask you this. To your knowledge, Dr. Collins, have the iPS cells substituted for the embryonic stem cells? Because that is the press accounts that we have seen that now we don't need embryonic stem cell research anymore.

Dr. {Collins.} They have not. I think we are still trying to understand what is the same and what is different

between a human embryonic stem cell, which is the gold standard for pluripotency, and the iPS cell, which has a lot of the same properties, but if you look very closely by some of the measures that can be done about things like epigenetics, DNA methylation and so on, it is clear that an iPS cell is not identical to an embryonic stem cell.

Ms. {DeGette.} And in fact, a lot of the researchers have told me--I am a layperson so that is why I asked--is that in fact all these types of stem cell research when done ethically are important to support because the researchers can use all of them to sort of help validate the other research and to help in the lab.

Dr. {Collins.} I believe that those who are studying iPS cells are pretty much all committed to doing side-by-side comparisons to human embryonic stem cells to see what the similarities and the differences are, and that comparison continues to be really important.

Ms. {DeGette.} That is what the researchers tell me too.

I want to talk to you for just a moment about the recent regulations that the NIH has developed on the conflicts of interest because many of us were on this committee in 2004 when we conducted our last investigation of the conflicts of interest at the NIH with your predecessor, and I know that

you have got draft guidelines out for comment. My question, we sort of had thought we had solved this problem several years ago, and I know Dr. Zerhouni was quite committed to solving it. What do these new draft regulations contain that are not in the regulations that were promulgated a few ago and do we think this is going to help solve some of the very real conflicts of interest that we are seeing with researchers?

Dr. {Collins.} So the discussion that you had with Dr. Zerhouni a few ago was largely focused on investigators who were NIH employees who worked in the intramural program of the National Institutes of Health, and there were some egregious examples of conflict of interest that came to light. The consequence of that was to tighten those rules up very significantly and they remain, I would say, above reproach in terms of the way in which those have limited any kind of bad behavior. What has not been taken on at that time, though, was to consider all of those grantees out in universities across the country who are not NIH employees, they are employees of universities, and NIH therefore has a different relationship, but recognizing that there were examples there as well where investigators who were NIH grantees were not disclosing that they were supposed their financial conflicts. NIH has now stepped forward to require

institutions to take a much more heavy hand here in terms of checking out whether their investigators are engaged in conflicts of interest, and there are several proposals here as part of the NPRM that we are now seeking comment on that would require a much more extensive disclosure of any kind of financial conflicts that investigators might have including posting those on a public website so that it is possible for anyone to see what is going on and not have this being done behind a curtain. This also requires the institutions to have a much clearer plan about how they are going to review and notify NIH about those financial conflicts. Again, we are seeking comments on those over the course of the next month. There has been this recent observation that in one instance an investigator left one university and was able to escape sanctions on that basis and we are now considering what could be done to prevent that in the future as well. So there is a lot that we can do here, although we are to some extent limited in that our relationship is primarily with the institution and not with the investigator.

Ms. {DeGette.} But if you required the institution to make disclosure, then that burden would be on them.

Dr. {Collins.} Indeed, and that is the goal of the NPRM.

Ms. {DeGette.} The Chair now will recognize Mr.

Whitfield.

Mr. {Whitfield.} Thank you very much, and Dr. Collins, we appreciate you being with us here today very much.

I know that NIH is involved in a lot of projects like the Molecular Library Initiative and your collaboration with FDA, EPA, the National Chemical Genomics Center and others to identify small molecules, their biological behaviors and so forth leading to I guess what we refer to as a big biology or human metabolome project, and I was wondering if you could just give us sort of an update on the money that is being spent on agencies on this and what you view the prospects are for this type of initiatives.

Dr. {Collins.} So I believe this is a very exciting area. This is bringing chemistry and biology together in a new and exciting way and making those resources available to academic investigators. It is another kind of high-throughput science. The idea here is that if you are interested in developing some kind of a compound, an organic molecule that might ultimately become a therapeutic, a drug, you need a way to empower academic investigators to get engaged in that process and not just hope it is going to happen, and that has given us the impetus to put together a series of four of these high-throughput screening centers, and you mentioned one of them, the NIH Chemical Genomics

Center, but there are three others. Collectively, we spend about $60 million each year on these centers, but it makes it possible for an academic investigator who has just made a basic science discovery to move into this possible translational application in ways that just weren't happening before. I would like to see us push that really hard right now, because we are in a circumstances where there have been a lot of basic discoveries that are perhaps even more ripe for translational applications than ever before, but many of them are too early for the private sector to necessarily see them as ripe enough for them to take on. If we could come up with a strategy for academic investigators, take it a certain way, de-risk a project, and then hand it off to a private company who would then carry it the rest of the way to approval, that is a pretty good model. Companies like that. We at NIH like that. This may be our path towards the future.

Mr. {Whitfield.} Now, it looks like there would be some real exciting breakthroughs and an opportunity here for partnerships with private entities as well.

Dr. {Collins.} I totally agree, and I think that is a new model that maybe hasn't really been tried to this extent before. Companies would tell you they are also really looking for new models. The development of new therapeutics

has not been going all that well for them in the last few years. Here is a way to speed that up.

Mr. {Whitfield.} And I have also been told that some of these new techniques have been used in analyzing the dispersants that they are thinking about using in the Gulf oil spill. Is that correct?

Dr. {Collins.} That is correct, so we have a marriage here between the EPA and the National Institute of Environmental Health Sciences, the National Toxicity Program and this NIH Chemical Genomics Center to try to use the same technologies that are being used to develop drugs to also study toxins.

Mr. {Whitfield.} Well, do you think you could put up with some of us sometime coming out to see the National Chemical Genomics Center?

Dr. {Collins.} We would welcome that, Congressman. Just let me know. We will set you up with quite a tour, and I guarantee you, you will be amazed at the way in which this operation has taken shape with a robot that is capable of screening hundreds of thousands of chemical compounds in just a few hours. It is amazing to see.

Mr. {Whitfield.} And Madam Chairman, I would like to yield the balance of my time to the ranking member, Mr. Shimkus.

Ms. {DeGette.} The gentleman is recognized.

Mr. {Shimkus.} Thank you. I just wanted to follow up in Chairman Emeritus Dingell's comments on the ARRA benefits on the tax credit--not the ARRA but the health care bill. I have been crying and asking for hearings on the health care law since I became ranking member. I am glad he took the opportunity to address the health care law. I do think questions like that could be done in a hearing on the overall law. I just want to put in the record that $27 billion in tax increases to the pharmaceutical companies makes it more difficult for them to do the R&D for new drug development. The 1099 provisions for small companies that require a 1099 form for every $600 cost added will add additional burden to small companies to be able to do that. So where there may be some tax credit help, I think a lot of people would say that the burden on the small pharmaceutical companies are increased under the health care law.

And I will just end on, the iPS system, as my good friend was talking, it may--there may be scientists who want them both to go on but the iPS does evade a very important question that would help unify us versus divide us. It does address some moral ethical problems that many Americans have on embryonic stem cell research, and I yield back.

Ms. {DeGette.} Mrs. Christensen.

Mrs. {Christensen.} Thank you, Madam Chair, and welcome again, Dr. Collins.

As you know, one of the great successes in the health care reform bill was elevating the National Center on Minority and Health Disparity Research to an institute, something that we are very excited about, and all of us who have worked for years in health equity or the elimination of health disparities are really anxious to hear about the role that you envision for this new institute at NIH, so my first question would be, what are your plans to ensure that the new institute will play a pivotal role in helping to ensure and coordinate all research efforts across all of the other institutions and centers so that they would include health disparity elimination variable and measures throughout the entire research design and spectrum?

Dr. {Collins.} So we also were delighted to see that the health care reform bill included this important redesignation of NCMHD now becoming the National Institute for Minority Health and Health Disparities under the direction of Dr. John Ruffin, and this does bring that part of NIH into the same status as the other institutes that direct many other kinds of research. It certainly underlines the critical way in which NCMHD and now NIMHD plays a correlating and organizing role in the entire NIH's agenda

for health disparities. That has been going on for some time but this further strengthens the hand that Dr. Ruffin holds, and I think we all welcome that.

This will of course further add to the important of those rolling 5-year health disparity strategic plans which NIMHD is charged with putting together with input from all of the other institutes. It will take lots of collaboration between the institutes, but I can tell you, having been at NIH now for 17 years, the important of health disparities and the investments that need to be made there is certainly a shared goal across all of the leadership but it is nice now to have an institute that stands up in a very visible way to take charge of that.

Mrs. {Christensen.} Well, thank you. In a recent interview, I think it was Science, you spoke of the pressures of year-to-year budgeting and the possible impact of our Nation's current economic situation, but if you had to find, as you said and you alluded to the possibility of it, you find yourself cutting grant budgets or cutting back on some areas of science or have to decide which institutes get the 3.2 percent increase and which don't, I hope that you will consider that the new institute is starting out brand new, is grossly underfunded, so as part of your plan as you implement the Patient Protection and Affordable Care Act to bring its

budget in line with the other institutions.

Dr. {Collins.} Of course, I would love to see that happen, and the challenge of course as you probably well know is all of the other stresses that we have on the overall NIH resource total as we face what may be a particularly difficult year in fiscal year 2011, recognizing the economic downturn and the ending of the Recovery Act dollars. We are going to be stressed in all kinds of ways trying to maintain the resources and the environment of the biomedical researchers who are so critical to our future. Estimates are that our success rates in fiscal year 2011 may fall to historic lows across the board, and of course, you can appreciate, I hope, that that makes any special kind of corrections even more difficult than they otherwise would be. We all hope for times where those things will be easier but I don't think that next year is likely to be an easy time.

Mrs. {Christensen.} Well, we don't expect it to be an easy time but they are starting out at such a low budget, and if they are really going to function as an institute, their budget would really have to be greatly increased, and given the extent of the health disparities in racial and ethnic minorities, you know, it really needs to be a priority.

In your testimony, both written and what you gave here today, you talked about diabetes, Alzheimer's, cancer, all of

which disproportionately impact African Americans and other racial and ethnic minorities but African Americans in particular, yet there was no mention of the disparities or how NIH would direct research to close those gaps. In that same interview that I read, you talked about a big think that occurred and the outcome of that big think were several areas that may need more focus and attention. Were health disparities one of them, and if not, is there going to be a big think about health disparities?

Dr. {Collins.} I appreciate your question. Yes, it was one of the very significant conversations we had. The big think was a meeting where I brought together about 55 or 60 individuals that I think are able to really look at the entire landscape and give advice about where investments are most needed and most opportune, and certainly one of the groups we had of the three groups focused very much on this general area, what can we do about the health of the Nation and health disparities emerged as a particularly powerful part of that. Reed Tuckson led that particular discussion.

Mrs. {Christensen.} Good.

Dr. {Collins.} And I think we got some strong messages, and of course, the summit that was held a year and a half ago that Dr. Ruffin organized very much focused on health disparities and itself produced a blueprint of additional

needs. The only thing I would want to say, although I would agree, we are not putting enough resources into health disparities, we are not putting enough resources into many other things too, but I hope it is clear that the investments in research on health disparities are not limited to that one institute, that every institute at NIH has an important portfolio in this area, and Dr. Ruffin's job is to be sure that we are coordinating that in a way that we get the maximum benefit from the dollars we are spending.

Mrs. {Christensen.} Right. I am aware that the other institutes and centers are doing research but we want to make sure that he does have that ability to coordinate.

You also said in that interview that we have a lot to do, and this is sort of a quote, at least part of it is a quote, ``We have a lot to do to figure out how do people decide about altering behavior.'' In the case of racial and ethnic disparities or any health issue, behavior is one of the many issues along with environment, access and others that requires research. Does your response where you say ``We have a lot to do to figure out how people decide about altering behaviors,'' does that response mean that we will see a greater emphasis on behavioral research at NIH?

Dr. {Collins.} I think it is timely to focus a lot of attention on behavioral research if we are talking about

prevent especially. So much of what we are learning won't do any good if it is not transmitted to people in a way that they understand and if it doesn't motivate health behavior changes whether it is diet or exercise or other activities, and I think you will see--in fact, one of our new initiatives in the Common Fund is called the Science of Behavior Change, how do we learn more about what actually is involved when somebody changes their health behavior, how do we inspire that in circumstances where we have the evidence but we haven't been very good at actually getting the result. You are going to see a lot more of that.

Mrs. {Christensen.} Well, you partly answered one of my other questions about what were you focused on in the Common Fund, but I am going to yield back.

Ms. {DeGette.} Mr. Pitts.

Mr. {Pitts.} Thank you, Madam Chairman.

Dr. Collins, a recent article in the New York Times claims that the Human Genome Project which you worked on has not yielded many medical benefits. Is that an accurate statement?

Dr. {Collins.} Well, you might not be surprised to hear that I didn't quite go along with Mr. Nicholas Wade's story. Mr. Wade has over the years been a bit of a cynic about genomics, and I think that came through loud and clear.

Today's New York Times in a different article by a different reporter has, I think, a much more upbeat and balanced view about the way in which genomics is inspiring new ideas about therapeutics. In sort of responding to Mr. Wade's rant, I sat down for 10 minutes just to see if I could come up in 10 minutes with 25 significant advances in medicine that come out of genomics, and I had no trouble doing so. Somehow they didn't appear in his article.

Mr. {Pitts.} Okay. Thank you. To follow along the line of questioning of the chairwoman, you said that regarding the regulations on conflict of interest that there had been egregious examples of conflict of interest with federal employees. Can you explain the type of example you are talking about?

Dr. {Collins.} Well, I will tell you the one that got attention in the last week, so a psychiatrist who was doing research at Emory University, Dr. Charles Nemeroff, was found to have been receiving large sums of money from pharmaceutical companies that he had not disclosed. Those sums of money were in the same general area as his own research, casting into some question whether his research results were in some way tainted by the receipt of those dollars. When that finally came to light, he admitted that he had been receiving those funds and claimed that he didn't

know he had to disclose them. Emory University in consultation with the NIH decided to strip him of his chairmanship and to also remove him as the head of his particular grant. Dr. Nemeroff then actually in the space of a year or so after that sanction moved to a different university, the University of Miami, where because of the current rules, because NIH's arrangements are with institution and not with individuals, Dr. Nemeroff was now able to apply for new grants. He has not received any grant funding from NIH, I am quick to tell you, but he was able to apply, and I think that raised a lot of questions.

Let me say, because I think it is important to put this into the record, that an individual was also involved in a certain way by innuendo in this, Dr. Tom Insel, who is the director of the National Institutes of Mental Health, was in some way implicated by a reporter as not having conducted himself properly. I would really like to defend Dr. Insel in that regard and to say that in his many years of service to the NIH, Dr. Insel has proven to be an exceptional scientific leadership, has led the NIMH with great skill, has encouraged innovative advances in biomedical research. He has been a person of great integrity, a dedicated and visionary public servant, and I am fortunate to have him on my team at NIH.

Mr. {Pitts.} Thank you.

Let me go a little further in embryonic stem cell research. About, if you can ballpark it, how many years have we been doing research on embryonic stem cell research, how many years in humans, how many years in mice? Can you just ballpark it for us?

Dr. {Collins.} So in mice for quite a few decades. In humans, it was in Madison, Wisconsin, Ms. Baldwin, where Jamie Thompson first developed the human embryonic stem cell.

Mr. {Pitts.} What year was that?

Dr. {Collins.} That was 1998.

Mr. {Pitts.} Nineteen ninety-eight?

Dr. {Collins.} Right, so about 12 years.

Mr. {Pitts.} Have there been any clinical trials using embryonic stem cells that have produced improvement for human patients?

Dr. {Collins.} So there has only been one clinical trial for human embryonic stem cells that have been approved by the FDA, and that is a trial by the company called Geron for spinal cord injury, and they have not yet enrolled the first patient because of safety concerns but are expected to later this year, so it is still early.

Mr. {Pitts.} Okay. What about with adult stem cells? Have there been any clinical trials using adult stem cells that have produced improvement for patients?

Dr. {Collins.} So adult stem cells covers a lot of territory. Certainly stem cells found in the bone marrow have been utilized for a long period of time for bone marrow transplantation and have saved many lives in circumstances where that was an important task. But importantly, those kinds of adult stem cells don't have the same pluripotency that an embryonic stem cell would and so their applications would be limited to certain things and would not be possible, for instance, to use those for all the applications that embryonic stem cells are being contemplated for.

Mr. {Pitts.} But there have been human protocols developed for human treatment, right, therapy for human patients with adult stem cells that you are aware of?

Dr. {Collins.} Again, bone marrow would be the one where most of those experiments have happened, so that has been very successful in that limited set of applications but would not have been possible to apply for other applications like Parkinson's--

Mr. {Pitts.} What about with iPS cells?

Dr. {Collins.} IPS cells are a new development as was already raised, very exciting, not yet tried in any human applications. We have just announced the formation of an iPS cell center on the NIH campus to try to speed up those applications for human therapeutic purposes but it will

probably be a few more years before we are sure that they are safe because those cells are capable of forming tumors.

Ms. {DeGette.} The gentleman's time is expired. Mr. Murphy.

Mr. {Murphy of Connecticut.} Thank you, Madam Chair.

My apologies if you covered this particular piece of this debate already, but I think last week the NIH advisory board authorized three new stem cell lines for research, and I just wanted to ask a broad question on that subject as to how that process of approving new lines is working and if you sort of feel that that process is moving swiftly enough in a sufficient manner.

Dr. {Collins.} So I think it was seven new stem cell lines that were put forward by the advisory committee advising me. I have not formally made the decision but expect to do so in the very near future. That brings to 73 the number of human embryonic stem cell lines that have been approved for use with federal funds.

I think the process is actually working quite well. Basically we ask investigators who have derived the stem cell lines to supply documentation about the nature of the informed consent that was used to obtain those because we want to be absolutely sure that that was done at the highest ethical standards. If they are able to do so in a fashion

that is right down the line to every detail consistent with the NIH guidelines, we approve those administratively and we can do that quite quickly once we have all the documents. But some of the stem cell lines were derived years ago and the process of getting consent and the specifics of the details have changed a bit over that time but we have a working group of distinguished bioethicists and biologists who look at those circumstances to try to see whether those particular stem cell lines at least follow the general principles that we would like to see, and if they agree that they have, then they put those forward for approval as well. They have approved quite a few of those.

Interesting, last week, though, they recommended disapproving a whole set of lines where they thought the consent had a problematic clause in it, which was basically what we call exculpatory language, which according to the common rule really should not be in an informed consent process and they didn't feel if were doing this carefully that we could allow that. That was a bit of a heartache because that was a whole lot of lines that a lot of people were I think helpful they would get access to but if we have guidelines, if we have ethical standards, we probably need to pay real close attention to them.

Mr. {Murphy of Connecticut.} And I appreciate even in

the face of some resistance your holding that line. I think the future of this research depends on people believing that there are ethical boundaries and qualifications for this research, and so I think it is to your credit.

To switch topics fairly dramatically, I wanted to go back to something I talked about in my opening statement about the intersection of private and public research. I have got a real interesting company in Cheshire, Connecticut, Alexion Pharmaceuticals, that produces a drug for a rare blood disorder that I won't attempt to butcher the pronunciation of. The drug is called Soliris, and it is an example frankly of a rare instance where a company has been able to commercialize a drug with a fairly limited application, only a couple thousand cases in the United States at a given time. And I guess my question is this. There are a number of different factors that go into your decision on where you place research. Clearly the top of the list is what in the public interest, what are the diseases and conditions that we have the greatest national interest in confronting, but I would assume an element is also what kind of research is most likely to be done in the private sphere and what research is most likely to not be done there and has to be taken up by public funds. So in the context of rare diseases, I guess I would ask for your opinion as to how that

calculation plays out with regard to rare diseases and whether we see more companies like this one in Cheshire being able to do this on a private basis or whether we continue to see the need to have a larger public role in that space.

Dr. {Collins.} I think it is going to be a little different for each disease, and I appreciate the question. I think for many rare diseases, the economics just aren't going to be sufficient to inspire a company to make the investment in taking something all the way to therapy if there is not already a pretty good idea on the table, and what academic investigators supported by NIH can now do increasingly is to make that possible.

There is a new program called TRND, which stands for Therapeutics for Rare and Neglected Diseases, funded by the Congress, $24 million this year and $50 million requested next year in the President's budget, which is exactly to try to provide that kind of de-risking opportunity for these rare-disease projects, not to take them away from a company's interest but actually to try to get them far enough along to inspire a company's interest, and we are seeing that happening now. That program has already started five new pilot projects for rare diseases. One is for a disease called hereditary inclusion body myopathy. Now, who has heard of that? Relatively few people affected, but there is

a very promising therapy and it just needs a little push to get to the point where a company like the one in Cheshire might be willing to pick it up. We are trying to do that, and with rare diseases not only they affect real people and you want to do something for those real people but we often learn things from rare diseases that have a broader reach. My own lab, because I have a small research lab at NIH studying an incredibly rare disease called progeria, which is a form of most dramatic aging, and we could only find 30 kids in the world to try on this clinical trial, which is currently underway at an amazingly rapid pace because we just discovered the cause of this a few years. But what we are learning from progeria is turning out to have pretty significant implications for normal aging and maybe that will turn out to be one of the most exciting things that has come along in a long time in terms of understanding the aging process, all by studying this vanishingly rare disease.

Ms. {DeGette.} The gentleman from Texas, Mr. Burgess.

Dr. {Burgess.} Thank you, Madam Chair.

Dr. Collins, again, welcome to our committee. Just on the issue of rare and neglected diseases for just a moment, this past week in the New England Journal of Medicine they had an article about the curious case of colchicine, a drug that has been around for 3,000 years, and yet the FDA decided

that since we have never studied this maybe someone ought to, so someone did, and they were given exclusive rights for colchicine for 3 years, an additional 7 years under the Orphan Drug Act, so people who suffer with gout, colchicine is a second-line drug of choice, but went from pennies a dose to several dollars a dose. For people with familial Mediterranean fever where colchicine really can be a benefit are now left facing a situation where their costs are going to significantly go up, so would the NIH be interested in proactively funding any of the research on some of these compounds that have been around for a long time to sort of preclude this problem from happening again to some other illness? Again, not many people with familial Mediterranean. The figure they gave the New England Journal of Medicine was 100,000. I don't know whether that is in the country or globally but it is not a large universe of people, but the people who have it are now significantly affected by the activities of the Food and Drug Administration.

Dr. {Collins.} Dr. Burgess, that is a great question. Dr. Daniel Casner at NIH is the world's expert on familial Mediterranean fever, and I know there is a good deal of anxiety about what this is going to do in terms of the costs of taking care of these patients. Exactly, I think this is something that NIH can do. I mentioned this program called

TRND, Therapeutics for Rare and Neglected Diseases, and one of its explicit goals is to try to identify compounds that have been out there for a long time and repurpose them for uses for rare diseases where they might actually have considerable benefit but nobody actually tried that, because if you do that, you have ended up with something which may be both inexpensive and actually you are pretty close to the point of being able to ask the FDA to approve it without going through those long, long steps of developing a totally new compound. It is a great idea. When we are searching for a new compound for a disease that there is no therapy, we always make sure, we check all the available ones that have already been given to patients that we know are safe and once in a while you turn up with something really exciting.

Dr. {Burgess.} You famously were interviewed on the Colbert Report, and--

Dr. {Collins.} Yes, it is true.

Dr. {Burgess.} --talked about making--attracting more young people to the study of science and the things you could do to make science appealing to young people. I think the term that was used was ``to make science sexy.'' How are you coming in that endeavor?

Dr. {Collins.} Well, maybe you a better judge of that, members, than I am. You may recall that Colbert suggested

that if I really wanted to attract scientists into the field that I needed to sort of loosen up a little bit, take your glasses off and shake out your hair, and against my better judgment, I did that on national television. But I am not doing it this afternoon.

So we are really interested, to get serious here, in terms of trying to recruit the best and brightest of the next generation. We were big participants in National Lab Day where we sent a lot of scientists out to high school classrooms to try to make science a little more real and hopefully less geeky than it often appears to be to the next generation. We are hoping to play some role in whatever happens next in terms of beefing up science in K though 12 education because clearly the way science gets taught to a lot of young people isn't very exciting, and it should be. This is the century of science, especially biology. So many opportunities for people that we would love to see them just jump on and come and join us because this is going to be an exciting time beyond any that anybody that anybody has experienced before. In the next few years, we are going to learn all this stuff. We are going to figure out how to apply it. What a great career.

Dr. {Burgess.} And I know this question has already been asked, but I was out of the room and I just wanted to

ask you to address briefly the--well, Dr. Zerhouni came to us right before--your predecessor--right before he left the post and talked about the wondrous things that have happened with the human genome and cracking the genetic code, the single nucleotide polymorphisms where there was just three in 2003 when I started in Congress. There were now, I don't remember how many he said last fall and there were more being discovered literally every week. But there was some disappointment with the clinical applications of sequencing the human genome, so where are we on that?

Dr. {Collins.} Well--

Dr. {Burgess.} Is it the brave new world that Dr. Zerhouni talked about or are we on a dead-end street?

Dr. {Collins.} You know, the first of technology says that when you make a major discovery, the anticipation of its immediate effects is always going to be overblown but the anticipation of the long-term effects will generally be underestimated. I think that is going to be true of genomics as well. There were a lot of wild claims made in 2000 about how this is going to change everything overnight. You and I knew that there was a lot more steps involved from understanding what the letters are in the DNA code to figuring out what to do with them. But I think the advent of personalized medicine is certainly coming along now in a

quite gratifying way.

In today's New England Journal, by the way, and I put this at your place, is an article by myself and Peggy Hamburg called ``The Path to Personalized Medicine'' going through some of these really exciting advances and also making it clear how FDA and NIH are working together to support them. So I think any declaration that the outcome of the genome project has been disappointing is probably just not based upon realistic expectations. I do think that revolution is going to be quite something when it takes full shape in the next 10 years.

Dr. {Burgess.} I want to come back to that partnership of NIH and FDA in a minute but before we leave the concept of the human genome, in the interest of full disclosure, I had my genome sequenced and it is a fascinating study, and I actually am glad I did it, but there has been some controversy about the direct-to-consumer marketing of these tests. In fact, our committee, our Subcommittee on Oversight and Investigations, is going to be conducting or is conducting a bipartisan look into that. I guess at this point what I would ask you is, would you be willing to work with our staffs on both the majority and the minority side as we look into this issue? Obviously we want this done correctly. We don't want people hurt or misled by the

process, and I think that is what raised the initial concerns when one company was marketing it in a commercial drugstore and then withdrew it, and it raised a lot of questions. You know, there is no question of the value of the procedure.

On the issue of the FDA, I mean you guys got a ton of money in the stimulus bill. I mean, it was almost immeasurable the amount of money you got, and no one ever had seen that much money before even in government. And so you produced--you put it to work and you are producing all this stuff. Now, the FDA as we heard the other day in another subcommittee hearing, it is kind of a little bit like a bottleneck in the pipeline. So how are you and Dr. Hamburg working out these problems between your two institutions?

Dr. {Collins.} So two ways and probably many other smaller ones but two major ways. One is the formation of this NIH/FDA leadership council, which will have senior leadership from both agencies at the table on a regular basis with projects and ideas coming to us both from industry and from the advocacy groups, all the stakeholders, to really try to say where are the bottlenecks, what are we going to do about it, let us get serious here.

The second is to have an actual scientific organizational plan about how are we going to give FDA some additional information about how to do regulatory science

because many of the things that are coming at them are new. If you have a clinical trial where everybody in the trial is on a slightly different combination of therapeutics, as will happen soon for cancer where combination therapy is going to be the name of the game with all these various targeted therapies that are possible, how do they review that? We need science to understand that. That particular regulatory science program is funded jointly by FDA and NIH but actually because FDA is a little strapped on cash, the NIH has come up with a larger proportion of the funds and we are happy to do that, and I am happy to work with a scientist and a physician with the capabilities of Dr. Hamburg. I think we are actually forming a pretty good partnership.

Dr. {Burgess.} Can we expect a--

Ms. {DeGette.} The gentleman's time is expired.

Dr. {Burgess.} --report at some point from you on that? Are you going to be getting back to the committee on that issue?

Dr. {Collins.} I would be happy to do that.

Dr. {Burgess.} Okay.

Ms. {DeGette.} The Chair will announce that we are expecting a series of three votes on the Floor. The Chair will recognize the gentlelady from Florida for questioning, 5 minutes, and then we will recess for the votes. We will

return immediately upon the completion of the votes because other members want to question, and if Dr. Collins agrees, if people have additional questions, we may come back for a brief second round.

Dr. {Collins.} I will be happy to be here as long as you like.

Ms. {DeGette.} The gentlelady is recognized.

Ms. {Castor.} Dr. Collins, the Clinical and Translational Sciences Awards are very popular. These awards are focused on translating NIH research into an understanding of health impacts. Does NIH plan to expand the initiative to create more CTSAs nationwide and include additional rounds of funding? I know that there is currently one CTSA in Florida at the University of Florida but the University of Miami has applied several times and has been denied, and the University of South Florida would like to get into that CTSA. They are popular because they include training funding, and there is a concern about where training funding will come from if CTSA grant applications are denied and will applicants still be eligible for training dollars from the National Center for Resources or other institutions under NIH?

Dr. {Collins.} Well, I appreciate your question because the CTSAs are a very important part of NIH's clinical research network and our plans including all kinds of new and

innovative approaches to clinical applications, therapeutics, diagnostics and so on. We have currently funded 46 of the CTSAs around the country. It is a very competitive process. There is another round of competition that has just gone on, and there will be a few more announced as a result of that, and then there is one more competition coming next year, but the goal was to fund a total of 60. That pretty much will exhaust the dollars that are possible to put into this, which is now coming close to half a billion dollars for these 60 centers.

We do very much expect that they are going to link up in interesting networks both regionally and nationally so that the whole will be greater than the sum of the parts, and every one of the CTSAs has been encouraged, as your question pointed, to focus on training, to focus on bringing together disciplines that maybe in the past had not talked to each other, even within an institution, but also to building networks around each of the CTSAs of other local institutions including community hospitals, and community outreach is a big part of this as well.

I wish we could come up with the dollars to fund 100 instead of 60 but 60 is probably as far as we can go. We do expect that out of this will arise a whole new way of approaching clinical research. I have been to visit now four

of these and I will go see another one actually tomorrow, the one in St. Louis. It is very interesting. They are all a little different, and they are taking advantage of what they have locally in terms of special expertise to make themselves different, and it is pretty exciting when you see the ways in which they have people talking to each other who never would have been in the same room before, and they are certainly encouraging training in clinical research, which has been a big concern because many physicians have been sort of staying away in droves when it came to research because they had big debts to pay, it wasn't clear what the pathway was, it wasn't clear where they were going to get mentored. The CTSAs are really helping to turn that around. It is going to be a tough process, of course, to turn that around because there are so many other things pulling on physicians, but I think this is going to be a really interesting few years to watch. The first CTSAs are just now coming up for their first renewal because this is a pretty new program. We have high hopes.

Ms. {Castor.} Good. I will look forward to talking with you more about how they evolve.

Training awards are also critical for our medical schools. These awards are relied upon to train medical students in specific disciplines, and most training awards

are within discipline-related institutes under NIH, for example, the National Heart, Lung and Blood Institute. I understand that it is increasingly difficult to get training awards. Is this because of a lack of resources and will there be additional T-32, T-35 training grants available and will additional funding be available for career development awards both individual and institution?

Dr. {Collins.} So we certainly believe that training is critical for our future and every one of the institutes has a special way of trying to support that. The National Institute of General Medical Sciences, NIGMS, is a particularly important part of NIH for training organizational efforts and they fund, for instance, the M.D./Ph.D. training programs, the medical scientist training programs, which are a way in which we are hopefully nurturing a particularly energetic and inspired group of future leaders who get both the M.D. and the Ph.D. degree. We have been both concerned about whether we are training enough individuals and whether we are actually supporting them adequately. One of the things that we are trying to do is to catch up on the stipends for trainees, which have been flat for a long time, and we are clearly asking people to remain in training positions. Many of them are already with doctoral degrees and really quite low salaries, and that is

beginning to be a problem in terms of recruiting people to do this, and we are going to try to pick up a little bit on that.

Again, resources. I keep coming back to that with many of the questions with the fact that we are facing potentially a very difficult time in fiscal year 2011 and perhaps beyond. We would love to expand training programs but where would we take the dollars from in order to do this with so many other needs for disease research, for grants and so on. We are every day trying to figure out how to get that balance right.

Ms. {Castor.} Thank you.

Ms. {DeGette.} The committee will be in recess until the completion of the third vote.

[Recess.]

Ms. {DeGette.} The committee will come to order, and the Chair recognizes Mr. Space.

Mr. {Space.} Madam Chair, if I could, I don't expect to exceed the 5 minutes but I did not do an opening statement today, if I could be permitted the luxury of 8 minutes?

Ms. {DeGette.} Yes, you are recognized for 8 minutes.

Mr. {Space.} Thank you, Madam Chair.

Thank you, Dr. Collins, for joining us today, and for offering your testimony and for the work you do at NIH. I personally think it is an underappreciated agency that we

should be devoting more resources and assets toward.

I wanted to focus my questions today, however, on one specific disease, and that is diabetes. As you probably now, the ADA recently conducted a comprehensive study in which it was determined that--these are 2007 numbers, by the way, which undoubtedly are significantly lower than they would be today, but they determined that we are spending as a Nation about $174 billion every year. Most of that money represents costs associated with health care for those suffering from diabetes and particularly those in the chronic stages, but a significant portion also represents lost productivity, and this is one disease in one year we spend more as a Nation than we did, for example, in just about any year during the war in Iraq. Obviously if we were to be able to cure this disease, we would mitigate and in fact eliminate the expenditure of trillions of dollars over the next 50 years in terms of the long picture.

I happen to have a son who suffers from type 1 diabetes. He is 19 now. His name is Nick, and he was diagnosed when he was 6 years of age, and after his diagnosis my wife and I, we knew very little about diabetes at the time but we began to educate ourselves on this devastating disease, and this was in 1996. Here we are 14 years later. In 1996, it was my impression that we were 10 years away from a cure, and this

was based on exhaustive studies and research that I committed myself because of an obvious personal interest, and here we are 14 years later and I am still hearing the same thing, we may be 10 years away from a cure. And I am familiar with the closed loop system and the concept of an artificial pancreas, that if every type 1 diabetic in the country had it would eliminate countless episodes of suffering, premature death and disability but it would also end up saving a lot of money in the long run.

And my question to you is regarding the special diabetes program. I understand that this has been funded at $150 million per year. Incidentally, it sounds like a big number, it is a big number, but if we are spending $174 billion a year combating this disease and when you take 10 percent of that figure and spread it out over 5 years, say, $17 billion, just round it downwards to $15 billion, if we spend $3 billion a year over 5 years, my opinion is, we could give every type 1 diabetic in the United States a closed loop system that worked and that was reliable and would more than pay for itself in a few short years. My question to you, Dr. Collins, is, what is your assessment of the special diabetes program, its importance to researching and developing advanced methods of treatment, maintenance and possible cure when it comes to type 1 diabetes?

Dr. {Collins.} Mr. Space, I appreciate your question, and especially the personal experience you have had with your son Nick, and I think parents who have had that experience must be like you, frustrated that we don't yet have a better solution to this clearly important and very serious disease of type 1 diabetes. The special diabetes program, which, as you point out, is $150 million a year, it is set to expire at the end of fiscal year 2011, and I know there are some anxieties amongst the investigators working in those projects about whether they are going to have to phase out their efforts at that point. It certainly includes a number of, I think, rather ambitious efforts, and certainly the artificial pancreas is one of those dreams that we all hope will come true in a broader sense in the not-too-distant future but obviously many challenges there in terms of how you get the engineering and the biology right so that you have a system that is reliable, because obviously any system that has the capability of delivering insulin needs to be failsafe because overdoses would be potentially very serious. I think there is real progress being made there but I am sure from your perspective and from mine, it is slower than we wish it could be.

In terms of type 1 diabetes and what causes it in the first place, we have I think a much better idea of what the

genetic factors are. We now have accounted for more than half of the heritability of type 1 diabetes, and there is this program called TEDDY which is now following several thousand children who are at high genetic risk to see whether in fact they begin to show some signs of the autoimmune component, which is the sign that the disease is getting started because as you probably know, by the time a young person shows up with actual symptoms of diabetes, most of those beta cells in their pancreas have already been destroyed by the autoimmune process and the best hope is to catch that early and then treat it with appropriate drug therapies including a new therapy called rituximab.

So I would say there is reason to be optimistic that the steps are moving forward but I hear what you are saying, that you heard that in 1996. I am impatient too. I want to see this disease conquered. I want to see the best ideas supported to make that come true. It is challenging to figure out for us exactly how to take the resources we have got and apply them in the best way. We do what we can in terms of estimating what is going to work or what is not going to work. There are steps forward. Sometimes there are setbacks, especially in clinical research where you know you have to come up with something that is both effective and safe, but I think with the way that the field is moving, and

it is hard for me to see that that dream you were promised in 1996 is not going to happen. It is very hard to put timetables on these kinds of trajectories. I wish I could.

Mr. {Space.} Apart from the obvious benefits associated with the alleviation of human suffering and saving lives, is it your assessment that that would also save a lot of money?

Dr. {Collins.} A lot of money, absolutely, and I certainly hear what you are saying both for type 1 and for type 2 diabetes the huge sums of money that we are in our medical care system are going to take care of individuals. We also have very vigorous research programs on type 2 diabetes, particularly now in prevention where we have the ability perhaps for people who are starting to tip over into that to be able to prevent the full onset of the disease, following up on the results of the diabetes prevention program, which has taught us how to do that with simple things like diet and exercise and lifestyle changes that can be successful if properly managed.

Mr. {Space.} And just finally, in the event that the special diabetes program were not to be reauthorized, would that have a deleterious or negative effect on advances in he field?

Dr. {Collins.} It certainly would. I mean, with all the momentum that has been generated because of that special

program, the idea that those dollars would sort of come to a halt would force the NIDDK, the diabetes institute, to make some very difficult decisions about what they could continue and what they could not.

Mr. {Space.} Thank you very much, Dr. Collins.

Ms. {DeGette.} Mr. Space, the Chair will announce that we have for--the Diabetes Caucus has asked for a full hearing on NIH efforts towards diabetes research and prevention and so we will look forward to that hopefully later this year.

Mr. {Space.} And I look forward to that as well, Madam Chairman.

Ms. {DeGette.} The Chair recognizes the gentlelady from Wisconsin, Ms. Baldwin.

Ms. {Baldwin.} Thank you, Madam Chair. I have ambitious plans with my 5 minutes of questions but we will see how far I get into this.

First I just wanted to make a comment. I was present when Dr. Christensen was talking, asking questions and bringing all of our attention to the issue of health disparities in minority populations, and I just wanted to share with you my interest in expanding the way we think of that to include also the lesbian, gay, bisexual and transgender population. In years past when we have had predecessor in front of the subcommittee or other agency

heads, I have asked about the state of knowledge on LGBT health and what sort of data collection we have, what sort of information, and I am sad to say that the answer was, you know, either we will get back to you or we are not aware of any even asking questions related to sexual orientation or gender identity to be able to gather the evidence and the data. I don't know what role you might have personally played in the focus that the IOM is now putting on this question but I am delighted and want to commend any role that you did play in bringing that together because I think it will examine the current state of knowledge and hopefully produce recommendations of where we can obtain even greater knowledge. So that is just a comment.

Really, with the rest of my time I wanted to get as much of a status update on some new programs, et cetera. If you don't have the information available today, please feel free to respond at a later point. But last year the Christopher and Dana Reeve Paralysis Act was signed into law. I had authored the freestanding bill before it was included in the public lands bill. And this authorized NIH to undertake two grant-making processes. One would fund grants for consortia in paralysis research, and the other would grant funds to maintain a clinical trial network with sites focusing on people living with paralysis. I am wondering if you can give

me any update on the implementation of this new legislation.

Dr. {Collins.} I would be happy to. Very quickly, in terms of LGBT, we are in fact supporting and we have done an inventory here some 272 projects through NIH research costing over $239 million, so there is a research portfolio there. But we are very much looking forward to the results of this IOM study, which I strongly support, to try to learn more about the needs and the research opportunities that NIH should be addressing.

In terms of the Christopher and Dana Reeve Paralysis Act, yes, there certainly has been as a consequence of that the formation of a network here which is funded by the National Center for Medical Rehabilitation Research, which is within the Child Health Institute. Traditionally that is where rehabilitation research has been located. But together with the Neurology Institute and the National Institute for Bioimaging and Biotechnology, that resulted in solicitation of a whole bunch of interesting proposals and in fact seven sites that received the best peer review recommendations are now being funded by those three institutes, and they are going to look at biological, medical, behavioral, social aspects of paralysis and very much try to make this a consortium effort as opposed to a collection of disconnected research projects.

Ms. {Baldwin.} Great. Thank you. Recovery and Reinvestment Act funds were awarded through the National Center for Research Resources to address the critical research infrastructure needs across the Nation but I would say that the funds were inadequate to meet all the critical needs that are out there, and so I am wondering moving forward, once the recovery dollars are expended, will funds for construction or remodeling of facilities be a priority and be allocated to NCRR?

Dr. {Collins.} So yes, we were delighted in the Recovery Act to have a billion dollars to put forward for construction and renovation, and those grants were rigorously reviewed and fairly recently decisions made and announcements put forward and those $1 billion is going to support grants and new construction in 146 projects in 44 States and the District of Columbia, so this was clearly one of those occasions where dollars from the Recovery Act were going to support both medical institutions and the economy in terms of the reconstruction efforts. Future funding is not included in the President's budget for fiscal year 2011, and I must tell you that when budgets are tight, as we fear they may in fiscal year 2011 and beyond, dollars for this kind of application are often hard to come by, and that is something that Congress decides, we don't decide. If we don't have an

allocation in that part of our budget, we are not allowed to spend the money on buildings and facilities so we wait to see what the appropriators tell us.

Ms. {Baldwin.} I see I have run out of time. So I will conclude. Thank you.

Ms. {DeGette.} If the gentlelady has a couple more questions, we had said we would be willing to do a second round, so you can--

Ms. {Baldwin.} Oh, I would be delighted to use just a couple more minutes and then I won't need a second round.

The University of Wisconsin has long been responsible for running the National Stem Cell Bank. This year we have been informed that NIH would like to take this process through a competitive rebid, and I wonder if you can tell me a little bit about what the timeline and the selection criteria will be for the rebidding of the National Stem Cell Bank.

Dr. {Collins.} So the University of Wisconsin has been such an important leader in this whole field. I think I mentioned earlier the contributions of Jamie Thompson and the way in which the Wisconsin effort led to the formation of this bank was certainly an important resource for individuals who would want to get access to these stem cell lines and knew that they had been properly maintained and they could

count on their quality. Now that there are, as I mentioned earlier in this hearing, 73 such lines that have been approved and going up, we are going into the hundreds before long, there is a big question mark in many people's minds about exactly what is the right way to make sure the lines are accessible to investigators who want to use them. Some of them will probably be used more than others. There will be some favorites, no doubt, as has been the case in the past.

What we are trying to ascertain is whether it is actually time for this kind of banking activity to move into a competitive private sector enterprise because certainly in other circumstances where there are biological resources that many individuals are interested in, the time sometimes arrives where it is more efficient and more cost-effective to have this conducted by a small company who would then be basically recovering their costs of distribution by a modest chart. What we don't want to do, however, is to have that end up resulting in excessive cost for NIH investigators. That would sort of defeat the purpose.

So we are still exploring what the right pathway might be but it seems likely that we will want to set up a circumstances where there is more than one bank, because obviously you wouldn't want to have the entire field resting

upon a single resource, and it will be, I think, a few more months before we have a clear sense of what is the best strategy for making sure that we have cell lines that are maintained at high quality and made available to investigators at reasonable cost.

Ms. {Baldwin.} I have two more topics. In the fiscal year 2010 appropriations bill, Congress called on the Office of the Director to engage in specific efforts to improve research on women's pain including coordination of a trans-institute research initiative in fiscal year 2010 that will support studies aimed at identifying common etiological pathways and with the goal of identifying potential therapeutic targets, and secondly, a conference to be held along the same lines. Could you tell me about the status of your efforts in this area?

Dr. {Collins.} So we certainly read that part of the health care reform bill carefully and we are happy to be called upon to work in this area of pain, which we agree is extremely important. There is a pain consortium at NIH which has been in place for several years which involves quite a number of the institutes that have an investment and an interest in this area, and this is another sort of encouragement for that effort to get even more involved. We are in fact planning the conference that is being asked for,

which I think is to be hosted by the Secretary in the not-too-distant future because I think there was a timeline on that, and there is also an exhortation in the Affordable Care Act bill about coming up with some new Common Fund ideas for pain research which is certainly something that is being looked at by the pain consortium to see if there are opportunities there.

In addition, there have been a number of specific workshops focused on particular subsets of pain to try to bring investigators together with new ideas, and I must say there are some exciting things coming along. I will just mention one, which is another example of how a rare disease can really lead you to a very interesting new hypothesis. There are rare individuals who are born with what is called congenital insensitivity to pain. There was a particularly dramatic publication a year or so again studying a Pakistani family where a number of the siblings were completely unable to feel pain, which is not actually good for you. These siblings end up involved in street theater where they would walk on hot coals or they would actually pass knives through their arms, obviously amazing people going by, not feeling pain but of course putting themselves in great jeopardy. The cause for that has been discovered and they are basically missing one of these sodium channels that normally transmits

the pain signal in the nervous system, and they are otherwise entirely well. Now, that is a really interesting finding and that says if you can identify a drug, a small molecule that blocked that activity and the rest of us transiently, that would be an incredibly powerful pain reliever, an analgesic, and many companies have now jumped on that description of a very rare family thinking this might be the best clue we have in a long time for a totally new approach to pain management.

Ms. {Baldwin.} Very interesting.

My last question, and you have been very tolerant of my battery of different updates, I am curious about the National Research Service award funding program. Are there any efforts underway to reframe that, change the amount or the allocation or training funds under that program?

Dr. {Collins.} So we are aware that stipends for NRSA trainees, the Ruth Kirschstein NRSA awards, have fallen behind over the course of many years without having a substantive increase in quite a long time and so we have supported a 6 percent increase in the current circumstance to try to make up some part of that and there has been a sense of the Congress and we agree with this that we should continue to try to catch up a big here. We depend on these trainees to do a lot of the front-line research. It is part of their training, but they are also really important for the

productivity of the enterprise. We certainly wouldn't want talented minds to go elsewhere because they just couldn't figure out how they are going to buy groceries, so we are doing what we can to try to catch up on that, recognizing that we have fallen behind.

It of course comes at a tough time if we are seeing a more stringent budget looming in the future. If we are going to increase stipends, we may have to decrease the number of trainees because there has got to be an ultimate reckoning, and we would hate to do that too so it is just more example of the tough decisions that may be facing us at a time where the economy is struggling.

Ms. {DeGette.} The gentleman from New York, Mr. Engel, is recognized.

Mr. {Engel.} Thank you, Madam Chair.

Doctor, before I came here, I was at my other subcommittee on the Energy and Commerce Committee, which is the Energy Subcommittee, and we were questioning the BP executives and some of the other executives, and I can tell you this subcommittee is much more friendly today.

Dr. {Collins.} Yes, I am glad I am at this time and not in that other room.

Mr. {Engel.} I want to first of all personally thank you for the good work that you do. I followed your work and

I am very impressed. You spoke at the New Dems several weeks ago, I was there and very, very impressed with what you had to say, so thank you, first of all, for all the good work that you do.

At that meeting with the New Dems, you had mentioned a drug called, I think it was Iressa, about breast cancer. I am wondering if you could just again tell us about that, and if somebody would want to sign up for it or anything like that, is that possible?

Dr. {Collins.} There are certainly trials going on, so Iressa for which the generic name is gefitinib, is one of these new targeted therapies for cancer about which there is a great deal of excitement, so Iressa basically works by blocking the action of a particular kinase, which is an enzyme that is normally present in cells but in cancer cells from some tumors gets overly activated by a mutation, and if you are somebody who has a cancer that has that specific mutation, Iressa can be extremely effective. I think I told the story of a woman whose cancer was diagnosed--well, she had lung cancer which was already metastatic to her brain in 2002 and expected to live for a few months. She is doing fine today, I am happy to tell you, because this drug was the perfect antidote to her particular tumor mutation.

Now, that is the good news. The troubling part of this

is that Iressa doesn't work for about 85 percent of people with lung cancer because they don't have that mutation. They have some other way that their cells have gone haywire and are causing the cancer in their system, but it does say that we are reaching the point with Iressa, with the drug I talked about in my opening statement which is another example of this sort of targeted therapy for cancer where you can sample a tumor and say okay, what is here and then look at your list of drugs that are available and do the match. As that match gets more and more possible because the list of drugs and the lists of targets gets longer, we are going to see a real transformation in the way that cancer is approached, and that is a great thing but it is personalized therapy we are talking about now instead of giving everybody the same does of chemotherapy.

Mr. {Engel.} Thank you. I would like to ask you a question on gestational diabetes. According to the American Diabetes Association, gestational diabetes affects 2 to 5 percent of all pregnant women, and that is 135,000 cases every year in the United States, and it occurs, I am told, in pregnant women who have never had diabetes before but develop it between the 24th and 28th week of pregnancy, and while it generally goes away after pregnancy, it can have health impacts for both the mother and the baby. I am told that

there is currently an insufficient system for monitoring cases of gestational diabetes to uncover trends and target at-risk populations, and for that reason, I and Dr. Burgess have introduced the Gestational Diabetes Act of 2010, and I am wondering if you could discuss some of the research currently underway to address the need for comprehensive information on the causes and best treatment of gestational diabetes.

Dr. {Collins.} It is a very important problem and one that we need to address both in terms of research and in terms of just the public health and trying to identify individuals who have risks of this sort. Gestational diabetes is in fact a risk to the pregnancy as well. It is associated with higher birth weight with prematurity and certainly something that you want to try to control because the mother who has out-of-control gestational diabetes is also likely to end up with preeclampsia. But more than that, if you get the mother through this experience, and most do, the risks that that woman will go on to full-blown diabetes are substantially increased and ultimately about half of women who have gestational diabetes will ultimately become diabetic.

So it is apparently one of those circumstances where pregnancy is kind of a stress on the system, and somebody who

may already be predisposed, it becomes more clear in the course of a pregnancy that that is the case. So we need both better methods to monitor during pregnancy, which means our medical care system needs to be of course accessible to those who need those services. It is not particularly difficult to assess this if that person is getting adequate prenatal care, and we need, of course, methods to prevent it in the first place, and it appears at the present time that the risk factors for gestational diabetes are pretty much the same as the risk factors for type 2 diabetes in general, which is to say family history, which is to say body mass index, obesity and exercise, and what we have learned in terms of how to take people who are predisposed to diabetes and prevent that from things like the diabetes prevention program are probably very applicable here as well. But certainly women who have gone through this experience and had gestational diabetes ought to have a particularly good opportunity to recognize the risks to their future health and to be given the same kinds of interventions that we now offer to people with pre-diabetes to try to reduce the risk of coming down with the disease. So there is a lot we can do there, but I agree, that has not been fully realized.

Mr. {Engel.} I would like to ask you about Charcot-Marie-Tooth disease. There is an innovative partnership

between the NIH's National Chemical Genomics Center and the Charcot-Marie-Tooth Association. I have worked with that association, and I think that this could serve as a model of future rare-disease research and drug development, so am wondering if you could describe the program and offer your thoughts on it.

Dr. {Collins.} I appreciate the question because I do agree, this is a very exciting program. My father-in-law has Charcot-Marie-Tooth disease, so this is a disorder that is not only something from my clinic but also from my family experience. And this is an interesting disorder which causes a weakness of the legs particularly but also the hands over the course of time, and can be quite debilitating, but it is well understood now what the cause of that is, the genetic abnormality has been now laid out in great clarity, but what could you do about it. So working with the NIH Chemical Genomics Center, which is a remarkable facility that has been mentioned already at least once in this hearing, an effort is being made to identify a small molecule, which is sort of a drug that would basically compensate for the genetic problem that is found in individuals with this type of Charcot-Marie-Tooth disease, so called CMT 1A, and that is an early-stage effort but it is a good example of this therapeutics for rare and neglected diseases effort that NIH is putting increasing

effort into.

Charcot-Marie-Tooth is too rare for companies to generally see this as a good investment for them in terms of developing a therapeutic but with the Chemical Genomics Center working with academic investigators who know a lot about the disease, if they can push this forward to the point of identifying a promising compound, then you could imagine a company getting pretty interested in licensing that out and carrying it all the way through to a clinical trial.

Mr. {Engel.} Thank you. With the Chair's indulgence, I would like to ask you about mental health problems of children and adolescents, because in my district, we have the Nathan Klein Institute and it is an internationally known psychiatric research facility, and they believe that the unmet mental health problems of children and adolescents is one of the most important continuing problems that haven't yet been adequately addressed, and the research funded by NIH establishes that 50 percent of all mental disorders begin in pediatric ages and 75 percent onset by age 24, and yet as of 2 years ago only about 8 percent of the budget of the NIMH was dedicated to addressing the needs of children and adolescents. So let me ask you this. How does research of pediatric and adolescent mental health issues fit into the themes of opportunity you have identified within your first

year?

Dr. {Collins.} Well, I agree with you. Those are critical issues because certainly the onset of a mental health problem in childhood or adolescence means that that individual if not properly diagnosed and treated is going to have a very long course. One of the things that I think we are trying to understand is, what are the advantages of early diagnosis and intervention. I think there is a lot of need also just to understand in terms of basic neuroscience what is going on in the brain in bipolar disorder, in schizophrenia, in major depression and a number of the other conditions that do tend to come on in adolescence. The Human Connectome Project is an effort to try to do that in a more systematic way, putting together genetic variations with what the linkages are in the brain between various regions and how those neurological tracks are different in people who develop one of these diseases.

But I hear what you are saying about the need to focus particularly on early onset risks, and here I think the National Institute for Child Health and Human Development working with NIMH, which has been the main source of mental health research, and also with the neurology institute, NINDS, is undertaking, I think, a pretty important effort to try to develop a better understanding of normal brain

development in young people and then also to apply that to trying to see what happens in the course of the development of one of these diseases. Certainly the National Children's Study when it gets fully up and going will also have the chance to look for very early influences on mental illness in terms of environmental exposures, genetics, et cetera, because we have not really had a very good database and that study which will study now 100,000 individuals from preconception until they age 21 should provide some other important clues.

Mr. {Engel.} Let me ask the indulgence of the Chair. I have another question. Could I--one more question.

Let me ask you about HIV and AIDS research because I think that is really important, and 56,000 people every year are living in the United States become newly infected with HIV, and in your opening statement you mentioned the many ways that NIH research has contributed to the information that we know and the increased life expectancy for HIV-infected people. We had discussed previously an innovative program in the Bronx where I am from. Can you discuss that program and also the current state of HIV/AIDS research, specifically at the community level that NIH is conducting?

Dr. {Collins.} So the program you are referring to is an innovative idea about testing and treating and then

linking to care. Let me explain what this is and why it seems to be potentially very beneficial. You are right, 56,000 new cases each year, and that has been pretty flat for the past few years. We are clearly not successful in reducing the new cases of this epidemic, even though we have developed effective antiretroviral therapy and individuals who are HIV positive can now expect to live many decades. Still, we should be doing better in terms of ending the epidemic.

The idea here is that most of the new cases of HIV or many of them, anyway, are actually acquired from individuals who do not know that they are HIV positive because at the present time many individuals do not get diagnosed until they have already developed some symptoms, they are found to have their immune systems already compromised. At least by mathematical modeling and by some small studies done in other parts of the world, it looks as if you tested every one of us every year to see who is HIV positive, and as soon as somebody turned up positive began treating them then, you would both improve their likelihood of a good outcome but importantly you would drop their viral load substantially so that their likelihood of passing the virus on would go way down. So the idea here is that you essentially reduce the viral load of the whole population by identifying infected

individuals as early a time as you could and mathematically it looks as if that could actually end the epidemic without having come up with a vaccine, which has obviously been an enormously frustrating circumstance. To test that, this test and treat link to cure, TLC effort--link to care--has been piloted just recently in the Bronx and here in Washington, D.C., with support from the National Institute of Allergy and Infectious Disease so that we are going to be able to see does this work, not in a mathematical model but in the real world, and we kind of thought Washington, D.C., was the real world and we thought the Bronx was too.

Mr. {Engel.} I do too. It is one of my favorite places. Thank you very much.

Thank you, Madam Chair.

Ms. {DeGette.} Dr. Collins, I would like to ask you one question on behalf of Chairman Waxman, who had other obligations. He is concerned about the peer review process and also the Cures Acceleration Network. As you know, the NIH Reform Act of 2006 required that all research that the NIH conducts or supports has to go through a peer review process, and you pointed out in your testimony that the process is critical to ensuring that federal dollars are spent on the highest quality research. The health care reform legislation that the President recently signed into

law established this Cures Acceleration Network, whose goal is to further research into treatments for certain kinds of conditions, specifically the ones we talked about earlier that have few existing therapies. The legislation established a competitive process for reviewing these CAN proposals but it didn't specifically require that grants go through the NIH peer review process, and so it is Chairman Waxman's understanding that the authors of the provision do not intend for the grant proposals to be subject to the process. What is your understanding of how CAN grant proposals are going to be reviewed by the NIH?

Dr. {Collins.} We depend on peer review for everything we do, and the way in which we would expect this program to go forward would be to invite projects that see ripe for investments of this sort which is moving them through the so-called valley of death where you have a promising compound but you want to get it all the way to a clinical trial. Those would have to be peer reviewed to see where in fact are the most promising projects, the most promising opportunities. This is high-risk, potentially high-failure science, but we at NIH are very motivated to push this forward, and the Cures Acceleration Network would provide us with some flexibilities that we haven't really had before. But it would be done with peer review.

One thing I want to say is that the bill does offer some DARPA flexibilities to NIH, so-called other transaction authorities, which we would welcome in that once a project has been peer reviewed and initiated, it gives the project manager some flexibilities about how to move the project forward and to kill a project if it looks like it is failing and missing milestones. So we do embrace that kind of flexibility but I want to assure Mr. Waxman that we would not imagine having projects get into this pipeline without that kind of rigorous peer review.

Ms. {DeGette.} Thank you, very much.

Mr. {Shimkus.} Madam Chairman.

Ms. {DeGette.} Mr. Shimkus.

Mr. {Shimkus.} Just to remind you of the importance of having a hearing on the health care law. It is not a bill, it is a law, and so we need to deal with it, so am glad that Chairman Waxman thinks that there are some questions that need cleared up based upon the law.

And also, you promised a great litany of things that we are doing and dollars spent. My opening questions dealt with this driving research thing that you are doing, $250,000. You said you would come back and give some answers on that. I would hope you would, because then it is tough for us to defend the good when we have questionable dollars going into

questionable directions that we need more clarification on. So thank you, Madam Chairman.

Ms. {DeGette.} Thank you. And just to reiterate, several of the members expressed to me during the votes that they will submit their questions in writing, so if we can get responses to all these questions, it would be great.

Dr. {Collins.} We are happy to do that.

Ms. {DeGette.} And I want to remind all of the members that they may submit additional questions for the record to be answered by the witness. The questions should be submitted to the clerk within 10 days and then the clerk will notify all of the offices the procedures.

And I would like to just thank you in particular, Dr. Collins. You have a very full plate. We are glad you gave us your afternoon. It was a wide range of questions. The members, I think, were impressed by the answers and we look forward to working with you, and this meeting is adjourned.

[Whereupon, at 4:30 p.m., the Subcommittee was adjourned.]