

StreamBox

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APSA Virtual Meeting

"How to Support & Retain Early Career Physician-Scientists / Insights on the Impact of COVID-19 on This Cohort"

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>> but here I am at home trying to manage as best I can what we can do about Covid-19, as well as trying to keep the rest of NIH going, even as most of my staff are also sheltered at home trying to stay safe.

I wanted to talk in a more general way. We'll come back to Covid-19 in a couple minutes. It is a special moment for us all to reflect on this, but also, where are we now in terms of the opportunities, the obstacles, the hopes, the dreams for physician scientists? Especially early stage trainees, which I know APSA has put themselves in the role of trying to support and provide data and encouragement, and I strongly support that effort and have had a chance previously to speak at APSA meetings when they were being held face to face in Chicago, and that's not possible this year.

I continue to say, despite all of the challenges, and Tenny junior has outlined a lot of them, both in terms of the New England Journal she was quoting from, as well as [Indiscernible]. There are plenty of challenges, but there is also an amazing opportunity right now for physician scientists to get engaged in search that's absolutely ground breaking. The opportunities built upon all the progress that's happened, particularly advantaged by new technologies, mean that many of the challenges and abilities to understand fundamental causes of disease and what to do about it are now things that we can actually expect to solve. In my own career, I was a post doc. I studied hemoglobin op theys. I hoped that someday we would know enough things about things like sickle cell disease to be able to help those people and to see this year not one, not two, but three different clinical trials using genetic therapies for sickle cell disease and having outcomes that look like not just benefit, but quite potentially cure for the first molecular disease. That is incredibly gratifying to see the way in which such things as Gene editing has made that possible is well beyond anything I thought would happen in my lifetime.

And then early investigator and junior faculty member at the University of Michigan, I started to try to understand what the cause was of cystic fibrosis, because we didn't know much about that in 1984. And by putting together a variety of approaches to try to move from a linked marker to gene, working with my friend in Toronto, ultimately found that Gene in 1989. Here we are 30 years later, after much hard work, and a lot of collaborative efforts academics and biotechs, we have some triple therapy, which means that 90% of people with cystic fibrosis who have a delta F508 mutation are finding remarkable benefits from this. Many who thought they were pretty much going to have a very limited ability to have a life span that you would strive to are now changing their views and beginning to think about retirement. What an amazing thing that is, although it stretched over 30 years, and we want some of those successes for the future to happen faster than that, and I think we can

claim that opportunity now because of the progress that's now possible.

You might say as a physician-scientist in Michigan back in the 1980s, I also was pretty stressed about whether I was on the right path to be able to make progress. I started as an assistant Professor in 1984 and have not published a paper until 1986. I had three years of no published cases trying to track this cystic fibrosis Gene and working on technology that was really challenging and many times didn't work. It was wonderful at that point I had an institution that was willing to believe in me and support that and dream that it was going to be worth take that go kind of risk. So that's another theme right now. I want all of you to have that same experience, to have institutions that support you and that believe in you. And I want NIH to be right near the top of that list, because you are our future. If there was of a time where we need physician scientists to be a critical part of our workforce, it's right now, because so much in science that's just bursting out of our laboratories cries out for translation and clinical application. Who better to do that than people who have physician training as well.

So we believe in you. We want to do everything we can to try to nurture and encourage your dreams, even though I know this is a tough road, and it was a tough road even before Covid-19. Now it probably seems even tougher for all of you facing that on top of everything else. We at NIH have spent a lot of time in the course of the last few years trying to see what we could do to further encourage physician scientists in all stages of training, and there have been some things that have happened along the way. We recognized and a lot of training programs forced you to compartmentalize whether you're doing full time clinical work or full time research work or maybe not the way to ideally encourage this kind of interest capabilities. And so more creative programs, very much something we need to see more of and also ones that don't take you so darn long to take you to independence, because that is not really a purchase Turing of -- nurturing of your potential. Maybe it's better off for the institution using your skills, but not for you, so we need to encourage those training programs to get shorter and more integrated, more efficient. We have to work with academic institutions to do that. We've been encouraging a lot of creative programs to do all sorts of experiments to see what might be a better combination.

We're interested in those programs that allow you to move from a training program to independence. The K99R00 awards, which have been around be for a long time, but which physicians somehow didn't think they were able to apply for, because we got very few applications, have now made it very clear. We're very interested in physician applications.

Dr. Kay Lund will speak after me and take about Ks and Rs and Ts and all of those things we do, also, to try to encourage various stages of training. Please pay close attention to that. There may be information there that is new to you. We have increased the you want to repayment -- you want to repayment -- loan repayment figure. We know a lot of people do acquire very serious debts along the way and we don't want that to be a deterrent to doing research, recognizing that research is often less financially beneficial in full time practice. And we have basically prioritized early stage investigators, people who have come to NIH for their first very application.

>> Captionist: Can everyone please mute?

>> We're determined to increase the numbers there very substantially. They're more than double in the course of the last 4 to 5 years. That's

our future.

There is a time to be getting into a research course, despite all the things you might here, a pretty good time, prioritizing early stage, coming up with these various ways to try to support creativity, flexibility, and best you think that somehow based on noises that float around and various institutions, NIH is actually having a tough budgetary time. We've -- budgetary time. We've been remarkably fortunate over the course of the past five years to see our budget at NIH going up by 40%. And we're hoping another year, which we're in the middle of now as far as budget process, will continue that trend, so year after year, we are getting increases of inflation plus two or 3%, which means we have real purchasing power that's going up, and that means it's a great time to be getting into the area, especially if you're an early stage investigator. So I want to be encouraging about all of that.

We're particularly interested, also, in supporting women who have special circumstances. We're ready to do more about family leave programs. We're talking right now about ways we might be able to provide a little bit more support for child care. We're intensely interested in the diversity of our workforce and have ideas. How to nurture those programs that maybe we'll talk about and are also widely available on our website.

Let me now come to the current circumstance of Covid-19. That is on everybody's mind. It's certainly on mine. I barely left my house except to take brief walks for the last couple of weeks. And yet it is a challenge that all of us who care about science and medicine have an opportunity both acutely and in the longer term to play a role in trying to help with. Covid-19 certainly came out of nowhere. Who of us in the middle of December who have dreamed that in early April we would be where we are with something like 80% of the country in some kind of role of stay at home, and yet that's what's happened. Of course, many healthcare providers being called upon to do exceptional things, and our hearts go out to them. Some of you may also be drawn into that at the present time.

We have, of course, an opportunity here to try to bring together the best and brightest of all the scientific enterprise that can work with this. Working with my colleague, Director of the infectious disease I understand tight, we are -- institute, we are moving at record speed to develop a vaccine for coronavirus, recognizing that's still many months away, as well as trying to get into clinical trial pipelines as many therapeutic opportunities as possible.

I convened a group yesterday of the heads of pharmaceutical company R&D divisions to try and ask, what is it that we can work even more seamlessly with the private sector, given the crisis that we're in the midst of, and got one 100% agreement to do that. So we're going to see something happen that maybe hasn't really happened since the 1990s when industry at NIH got together to find an HIV retroviral. We need that same attitude now and it's happening all around us. That's where I'm putting, as you can imagine, a lot of time and effort, along with Dr. Patch and I many others.

Fauci and many others.

This might also be a moment to position scientists to rise to the occasion of being major players in solving a global pandemic and maybe this is also a time to entice the next generation coming along to see why this is such an important career path. Maybe this is our Sputnik moment to wake up our own country to the importance of something people going into science and now particularly in life science, because that's the certainly try they're in.

I know I'm reaching a little bit here to try to find a silver lining in what is clearly a very dark and troubling time, but I always try to do that, because that's kind of the way I'm wired and I hope you are, too. NIH wants to be as supportive and flexible as possible with all of you at this time. I know trainees who have been sent home in the middle of experiments are really frustrated and worried that they're losing time and losing competitive advantage. Well, don't worry too much about the competitive advantage, because everybody is shut down. But I do think we ought to help you in every way in terms of time tables. It's a lot of information that is being posted to enable people to take advantage of flexibilities and deadlines to be shifted. We want this, as terrible a crisis as it is, not to be one that interferes in the long-term with your own opportunity to get the kind of training that you need.

So with that, I think I'm going to just say I'm really glad to have a chance in this virtual way to speak to those who are able to get on the web part of this. And I gather when it got to 101, that was it. But others who may have called in on the phone, and I will try to stick around here during the course of this panel discussion with questions at the very ends, try to see if I can answer them, even though I might have to do a little bit of work in between. So thanks, everybody, and I'll turn it back to Dr. [Indiscernible]

>> Great. Can everyone hear me? Yeah. Okay. Great. So we're working on increasing the number of spots right now. So we're changing the account. So stay tuned. Hopefully they can get it done in about five minutes. Thank you very much, Dr. Collins, for your tour did he force review of your career as a physician-scientist and on going effort for NIH for research, all the ongoing tools we have to tackle this and what you're doing for Covid-19.

Our next speaker is Kay Lund. And I think she is joining us by phone, because we were not able to have her on the webinar. We apologize for that and a half other. We've never had this issue happen to have since we've never had this many participants sign on before. I was on earlier/I was on earlier.

>> I will go ahead and advance your slides and I'll be same to advance them. So this is Dr. Lund, current Director of the NIH biomedical workforce. She actually did a lot of work elucidating peptide one and she's the holder of two patents for that. She's been a scientist and mentor before joining the NIH as the Director of the biomedical workforce. So we're going to go into her talk, so this was her title slide, strategies to recruit and retain physician scientists in the workforce. NIH funded physician scientist workforce.

>> I'm not seeing it yet. Do I go to webinar again?

>> Yeah. Yes. Yeah. So it's on the topics slide. I can tell you what slide we're on and you can just talk about your slide.

>> There I am, I think. It says the session is full.

>> You can open your own slides and we're on the topics slide.

>> On number 1? Recruiting physicians?

>> Yeah. Overview of NIH programs for research training.

>> Yep. Okay. So the topics is the overview of NIH programs, some outcomes of T32 post-doctoral appointments by degree. Recent data for the MD-PhD programs, and I really want to focus on the updates on the NRSA awards, the new program for search and residency, and then updates on investigator and loan repayment program.

I'm going to the next slide now, and I hope other people can see them. This just shows the Funding options across the career path, which talks about G32, the scholarship, R38, K38, and the K01 #. I'm not going to focus on that much, because it's not that relevant to physicians, but the KR and K23 and [Indiscernible].

The second slide, I just want to be sure that everybody knows that it requirement for all OR CCIDs, it's required for individual appointed to institutional T, K, and R25/R38. And required for NRSA fellows and individual career awardees, and this is in the application effective January 25. So be sure everybody who is actually doing that knows to put in the request for the [Indiscernible] and it's not a difficult thing to do.

So we have this study where we looked at the outcomes and this is the slide now showing outcomes of post-doctoral T3 approximate two appoint Z.s by degree. We looked at more than 467,000 post-doc appoint Z.s since 1995 putting them into different co horses. The important part of this, with PhDs, those with MDs and those with pHDs, the PhDs and MDs remain relatively constant. Appoint sees to the T32 and MVPH, [Indiscernible] or appointees and it may be instead of going on to a T32, they're going for a K0 or another --

>> Captionist: Speaker is a bit muffled.

>> We're going to 7%. This next slide, and can you see this one now?

>> Yes. Uh-huh.

>> This shows the T32 post-docs applying for career development awards. So we're finding a much higher MV PhDs, [Indiscernible] toward it. But what we're finding, pHDs is pretty low. The rate for all degrees were higher and PhD and [Indiscernible] were higher than the PhD.

Those who applied [Indiscernible] but this is one of the reasons I'll talk about later where the T32 to career development, the access to career development might have been enhanced and I'll mention more about that.

[Indiscernible]

>> Captionist: Having trouble understanding the speaker. She's muffled.

>> Pretty small percentage applied, even though, again, MD, PhD appointees were the highest proportion. The funding rate for PhDs and MDs are pretty good. But again, it's a small percentage. And the PhDs are lower. And actually, the rate of all degrees is low. So this is one of the reasons for the T32, we definitely included some of the [Indiscernible] recommendations, which were to really enhance the F32 programs for community development retention.

And this just shows [Indiscernible] about the outcomes in MVPM in programs, and the appointees personal increased dramatically as women appointees increased on the represented groups increased, but there's still a low representation of women on the MVPH programs. If you look at the factual by on MD-PhDs. Women are less likely than men to have a faculty appointment. Lower afternoon time to degree. And we all know [Indiscernible] advantage groups, less success in transition from mentored to independent NIH grant. So this was an evidence-based he know is chancements which was included in the new NIGMS-MSTP-FOA. People can take a look at it. It has an emphasis on improving have I Verse at this and career development. In the current [Indiscernible] we just issued, we have included the things that are relevant for the NIGMS.

Now, the [Indiscernible] applies to all postgraduates and Docs, so graduate students and post docs [Indiscernible] so just some input on updates and recommendations, clinicians and the NRSA in it general, we really um plimmed stipend increases, particularly to post doc and his pre-Docs between 2016 and 2020. And the latest entry level site and post doc, which was approved by the NIH Director, 5,207,800. And * * * -- 72,700, and this was recommended by named trying on the P3 it to enhance training to improve retention, NIH funded work. This is pretty important. to monitor things that I have in a previous slide, I will say that I would strongly recommend if someone has a T32 and they're having some kind of regular meeting, of course they should have a regular meeting, but it's also a good idea to actually bring in more than one relevant T32. You can actually have individuals talk about cross discipline. One of the most important ones, this is not implementation

[Indiscernible] happen, especially to clinicians. And [Indiscernible] at times in research teaching or clinical duty, paid from a different source than the NRSA.

This is definitely important to clinicians. They really need to continue to do clinical duties. They can be paid from a different source than the NRSA, but again, there are different institutions, and even some NIH institutes and [Indiscernible] not necessarily doing uniform implementation. So that's important.

Ongoing NIGMS, new predoctoral T32 and MSTP, FOAs, which have enhanced rigor, reproducibility, and data science. The new parent T32 has also that. And also includes quite a lot of the community development components that are relevant to the parent T32 from an OGNS.

If we go to the K awards, the ones that are the most relevant to clinicians are the COAs and the K2323. Right now, these require that 75 percent [Indiscernible] although this clinical specialties commit 50%. And there is definitely an ongoing discussion about whether we should actually enhance the number of clinical specialties that can be 50 or maybe according to the parent FOAs, but it should be between 50 to 75% as relevant to the particular specialty. The good news is that there was an increase in the salary cap in 2020 to 1,978 ever -- 197,300. As people mentioned, that does not necessarily see equivalence to what physicians would earn and that may be one of the issues they face. But definitely check the research website which talks about the different KOA and [Indiscernible]

The K99 is multiple types of these awards, which is a post-doctoral award, and then individuals get a job at another institution and they can transition to zero. What is true about these awards is the majority of the PhDs. Some are awarded to clinicians of it's not very many, though. And then NAD is in the first institute to publish a A99 -- K99 for requisition scientists. It's also recently instituted one as well. But it's only required 50% [Indiscernible] and there's no citizenship requirement. So this at least is saying that there are concerns about physicians being able to put in the 75%, so I think that's worth a discussion in the future.

So the research, in residency programs, well launch -- was launched about three years ago. The R38, last application date happened in February. There is a discussion about renewal and the potential for NIH institutes to join me of them already doing actual national institutes of aging also signed on to this.

The good news about this is that they've been pretty successful. Most full departments in disease-related research have joined these programs, but it's difficult to pull multiple [Indiscernible] out of one program. Very strong mentoring components and multidisciplinary teams.

This particular residency program was 80% time over one year, and that can stand multiple years of residency. So you don't have to put # 0% time in each year of residency. It's 80% of a year over the entire residency. And then I think one of the really good things is that it's something on this program to allow the residents to go to boot camp and training mechanisms and it can rapidly give them some expertise that they need for that particular program.

R38, each of the team who have been appointed have the eligibility to apply to the K38. The section application due date is October 15th. It's a [Indiscernible] it can be transferred to a different institute than the residency and there's much less information required in this RF A than

for a K08 or K23, and anyone who gets one of these K38s is still eligible to apply for a K08 or K23. They can go for another award as well. So we don't have a run of data yet as to how many of the residents transitioned for a K38, but stay tuned and we can update on that. And then I did make to make sure everybody is aware of the early stage investigator definition. This is a program Director completed that terminal research degree, which is typically the PhD, or the end of postgraduate clinical training. And it used to be the end of residency and we changed this, because we were concerned that many clinicians, even after residency, have required clinical fellowship. So it's really important that as a clinician, they make sure they have the up-to-date information in the ERA common profile.

And then there is now this ESI extension request. This is the noted 18235. This you can request the extension for medical concerns, clinical training. The new policy in this notice, this application for one year extension for [Indiscernible] this is the automatic extension of women who have block time during having to have parental responsibilities can apply for the amount of time they lost. Now, there will be extension requests now for Covid-19 if there have been delays. Obviously, Covid 189 is relatively new. It may be that people should wait and put in the application foreign extensions when they know how much time they've blocked, and then there is an extension request about the education section with the PI's profile. And then with a video tutorial link, we show people how to apply to the extension request.

And then the last part is the repayment program. [Indiscernible] there was an increase in the eligible maximum you can apply for, a maximum of 50,000 a year, and \$200,000 or more to receive the maximum. The first award require that [Indiscernible] and there's going to be at least 50% research effort during those years, and then after that, you don't need to apply for two years. But these have been pretty successful, pretty high success rate, around 50%. Highest from the PhDs. Next for MDs. Obviously, because this is really focused on clinicians, but also PhD and his other degrees are allowed to apply.

So I've got these links to actually choose the relevant Covid-19 issues, and as far as I know, the other people make [Indiscernible] and we'll take questions at the end.

>> All right. Great. Thank you so much, Kay, for going through the NIH funding opportunities and also changes associated with Covid-19 and it's still taking delayed grants.

>> So.

>> So our next speaker is Dr. Nancy brown. She is the current dean at Yale university School of Medicine. She is a physician-scientist herself who has mentored many physician scientists. She is on the board of NIH national advisory resources council, NHI advisory council, as well as [Indiscernible]

>> Captionist: Terrible echo.

>> She has studied the effects of anti-hypertensives like the Ace inhibitors and angiotensin receptor blockers and also streets patients who are resistant, have resistant hypertension and secondary hypertension. She is a member of ASCI, as well as the national academy of medicine member as well as a hallmark of her accomplishments as a physician scientists. So Dr. Brown?

>> Thank you very much. Next slide, please. So you've heard from Dr. Collins that this is an incredibly wonderful time to be a physician-scientist. And I have to say that throughout my career, there has been concern about physician scientists as the endangered species. There is a famous article in 1979 by James Weingarten to that effect. But the truth is there's never been a more exciting time where we've had a better understanding of molecular mechanisms and better ways to uncover molecular mechanisms of disease.

Next slide. You heard from Dr. Lang -- I think you may have skipped -- no, that's finds. Lund did some of the mechanisms who were NIH funding, the alphabet soup of grants that we have. What I'm going for talk about today is how institutions can support our physician scientists across the pathway and for those of you in absentia, really a guide for what you should look for in institutions as you're planning your career. And the support is else in not only to retain physician scientists and ensure that they're successful, but also to make it more efficient. And Dr. Collins mentioned this. You've all seen data like this, suggesting that fits scientists are becoming older and older as we achieve our first independent funding in RO1. Next slide.

So this, of course, is the standard pathway through which many of you are training for physician-scientists. The MD/PhD pathway on the top. But many others enter later after they've done clinical training and discover the limitations of our knowledge. And so one institutional opportunities is to create PhD programs that can be offered during the fellowship period for those late bloomers where one can emerge during the T32 training time and at Yale, for example, we have a PhD in investigative medicine that's been very successful in this area. Next. We'll go through these next couple of slides. One of the early gaps -- stop right there, thank you. Too far. One of the early gaps in funding is this transition from T 32 to the first career development award. And traditionally, that has been covered through foundation awards, and you'll hear about that, as well as institutional money and more recently, through NIH awards to institutions to selected people in the co assaulted K12. And so what dorks so-called K126789 I'm he going to talk about institutional efforts to funds this period. Next.

And I'll use an example from my prior institution, Vanderbilt. The Vanderbilt physician-scientist development program, as it was called at the time, which was [Indiscernible] in 2000. 20 years ago now when we had a very small number of candidates for awards, and the intention of the program was to increase the number of --

>> Captionist: We're getting an echo.

>> The faculty who get these awards. Next. This program had very important characteristics, and the first was that it would provide salary support for protected time. And this came from the institution, and the return on this investment over years was [Indiscernible] the second was that it [Indiscernible] that the Chair, the department also invested in the trainee's research. And this, in essence, gave the department skin in the game, as it were, and a vested interest in the success of the trainee. Next.

Equally important was that we required everyone to have 75% perfected time, just as you do for a career development award, and we did this even for procedural specialists, because our experience was that physician scientists could not commit to this. They often fell off the trajectory. Next.

We asked the awardees work in the research space of their mentor, and this is important, because I think often at this stage, physician-scientists are so intents on becoming independent that they become isolated and it is very valuable to have our trainees in a space where we can walk down the hall and request a research technician, who is experience how to do things. And next.

And candidates are selected on a competitive basis, which meant that they submitted a research proposal which, frankly, gave us some concept of not only their own thinking, but of the quality of mentorship that they were receiving early on. Next.

Equally important, next, was that we monitored participants very intensely at 6-month he wants values. Next.

And the seconds year of fund being was contingent upon progression, evidence of progress, including usually submission of a K award. Next.

And again, we required that the clinical chair articulated a commitment, because we understood NAACP people could not succeed without this commitment. Next slide.

The second gap, keep clicking through these, please, comes in the transition from the career development on award to the RO1. And ideally, one submits that -- you can stop there. That RO1, after about 3 to 4 years of the K, and it's funded the first cycle through and there's no gap. But in reality, something happened and there's a delay. It's not funded the first time through on resubmits and there may be a gap in funding. And it is equally important that institutions are prepared to support trainees and young faculty during this period.

Now, to increase the success rate, while I was associate dean for physician-scientist development, we created something called the Newman society. Next slide.

Which took all of our K awardees, including those in the K12 programs, and created a career development program. Next slide.

This program included institutional support for the dean. Next slide.

Again, oversight of mentorship, because where he appreciated this led to intense attention too the timeline. A career developments seminar series that covered such topics as how one develops a lab, how one uses a mentor, how one hires and fires sometimes. The things that all of us had wished we'd learned, but learned by the seat of our pants.

Now, interestingly, next, this Newman society also created cross fertilization among young faculty in many, many departments. We also created, next, a repository of successful grants, which now has grown to include not just RO1s, but U awards and P awards where one can learn how investigators respond to initially negative critiques, for example. And lastly, we've created an internal, next, grant that allowed young physician scientists to receive that critical input before we submitted their grant to the NIH.

One of the things, next slide, that we have subsequently come to appreciate is there's another gap in the development of physician scientists training, and that is the late gap after one has received their first star win. And now, instead of having 75% protected time, perhaps 30% or 40% protected time on a grant. And needs mentorship to make sure that he or she Garners the funding or receives credit for collaborative work. This is a real gap, if you think of the next slide, you'll see data on retention among first RO1 recipients, and attrition rates right hand significant. So it's more important that we invest in our faculty there, and as chair. Department of needs, I created a vice-chair who spent time [Indiscernible] career to help them. Next slide.

So in closing, I think I will just share a few things that we've learned about institutional investment in physician-scientist development. Next. The first is that it's important to have competitive selection to help hone the skills of those an supplying and to make sure that we're investing in the right people. Next.

And as I mentioned, there is not one size fits automatic. Some people enter this program through MV PhD programs -- MD-PhD programs. Others through intense training during their fellowship. Next.

I didn't talk about this in-depth, but environment matters and that's why it's important to be embedded in the laboratory of a mentor, but it's equally important to be in a strong department environments and with --

>> Captionist: Everyone needs to mute, please.

>> Next. Central aislessed oversight enhances the success and is particularly important for departments where there's a small research footprint. Again, next.

In lean times and perhaps this is true in the post Covid environment, we particularly need to separate our investment beyond independence. And lastly, we get what we ask for if we want to develop physician scientists, we must invest. Thank you very much.

>> All right. Thank you very much, Dean Brown, for going over an example of what you did at Vladimir Putin to support physician scientists and how you're fostering them. And our next --

our next speaker is Dr. Domingo. Are you on the call? Dr. Bibbins-Domingo, are you on the call? Hello? Is she on? I'll try to communicate with her in case she comes on a little later. But what we can do is -- let me hold on here. I'll go on to the next speaker. * Dr. Hafler. So our next speaker is Dr. Hafler, currents chair. Actually, let me switch over so that he can control the mouse. So he should have control of the mouse now. So let me introduce him. He is the Chief of neurology and Professor of immunobiology at Yale university School of Medicine. He has been credited with elucidating the mechanisms of multiple sclerosis and helped identify genes that were associated with this most likely autoimmune disease. He has also looked at the interactions between the immune system and also viruses. He's very world renowned expert in immuno biology and multiple sclerosis, publishing many cell nature "New England Journal of Medicine" papers. Dr. Hafler?

>> Thank you. It's a pleasure to be here. Let me apologize for those of you who can't see the slide very well as posted later on. So if I can control this. Coverage don't so that I can. Let me go to the next slide.

>> Let me just double-check. I'm pretty sure I gave you permission. So you couldn't advance it?

>> Pushing all the buttons.

>> No? Okay. If not, I will advance it. Now am I controlling it? May have to take back control. I can't advance it.

>> Can you advance it?

>> I will try.

>> You should have access to it. You wanted to try it again?

>> I will try it again.

>> Okay.

in this taskforce we were asked, what is a physician-scientist? With the Covid-19 crisis in front of us, it really made me reflect as to what I really do as a physician-scientist. And I chaired Yale's neurology department, but I'm chained as a basic and translational immunologist. Code PI on the human immunology human project consortium, a national group of different centers, are investigating responses to virus. So this really needs to the reflection of what we can do with our skills sets uniquely as a physician-scientist to address a problem. You can go to the next slide. I'll just say click. Okay. So you can stop there.

Okay. So what we do is identify clinical problem. With Covid-19, there's an obvious clinical problem that patients die of a respiratory syndrome with different inflammatory cytokines. They then explore the basic related science. We go to the bench and do fundamental experiments related to the clinical problem. But what we uniquely do as physician scientists is really connects the dots of the clinical and scientific observation and really it's all about designing and implementing the clinical trial leading to a treatment. Next?

[Indiscernible] a bit of own view on immunology. I apologize to those who can't see the slide. [Indiscernible] check pointed inhibitors for treating cancer.

>> Can I interrupt really quickly? Now we've expanded access and we e-mailed all the people who have signed on so they can now see the webinar.

>> Should we wait a second?

>> Captionist: Please ask everyone to mute their lines.

>> Go ahead.

>> I think all of you have heard about checkpoint inhibitors in treating cancer. The anti-PD1 has had an effect on the treatment of metastatic melanoma. This year's Nobel Prize, according to a number of immunologists who fundamentally led to changes in how we treat cancer. Click.

So what happens, tumors are recognized by T cells, but a negative signal on the tumors, PDL1 induces a negative signal. Click.

This leads to nonfunctional T cells, and they presently [Indiscernible] receptors such as PD1, three, and TIGIT. Next.

And this leads to the inability of the T cells to clear the cancer. But with anti-PD1 monoclonal antibody, click, the T cells become functional and with dramatic effects on the therapy of cancer. Next slide.

The same thing happens with T cells in viral infection. They also can develop this standard exhaustion where they no longer work. But a virus, a viral infected cell presents antigen T cells through the [Indiscernible] complex. Next?

The T cell becomes activated and secretes their cytokines in an activated T cell. Next.

And this leads to T cell clonal expansion with exhausted nonfunctional T cell. It's expressed as [Indiscernible] receptors, which I discussed as PD1 and 2-degree. Next?

So these exhausted T cells, there is a paradox in that with viral infections, one of these exhausted T cells, yet they don't function. So now we go back to the [Indiscernible] and our lab has been interested in another co-inhibitory receptor called TIGIT. A number of years ago, our lab stated the function of TIGIT on human T cells. Click. Here we have a flow histogram where we use an agonist necessary tick Whig, and we see the agonist necessary -- agonist [Indiscernible] secretion. Next?

Next slide. So as very fundamental science of lab was doing as far as the collaborative program pro-deck I granted, we asked what induces these models in humans. We knew that the mice had certain pathways, determined a PD-1 and in this exhaustion module. We didn't know what was in humans. This is what we uniquely do. And we covered that IFN-1 drives TIM-3, but inhibits TIGIT. One looks at the slide and one can see that the difference between control in interferon type one, you have this marked decrease in TIGIT expression, by TIM-3 goes up. Next slide.

One looks at the cytokine, the action expression of TIM-3 and TIGIT, on the left panel we have media, on the right panel he is, inductions with type 1 interferon. And if one looks at the TIGIT expression from media to interferon, you go from [Indiscernible] to marked decrease. Click, please. Whereas the amount of expression TIM-3 goes markedly up. That was a basic science observation. Next slide, please.

So this is what we do as physician scientists. We connect the dots. Click, please.

So we do basic science. And I'll just ask that you keep clicking. So click. So we want to ask, what I think cues quo inhibitory pathways in humans. We he would Lucy indicated interferons did this. In Covid-19, there's a massive interferon and cytokine storm in respiratory distress, and yet the T cells expressed co-inhibitory receptors. This is confusing. Why is it the T cells in the lung are inducing cytokine storm [Indiscernible] next.

So we want to bring the science to the clinical observation. Next. Click. So interferon induces co-inhibitory receptors. What does it do to the TIGIT? The basic observation was this disconnect between the co-inhibitory receptors and TIGIT, which wasn't known. Click.

So connect being the dots, click, so the question is does type one interferon induced by the SARS viruses, TIM-3 while inhibiting TIGIT. It's possible TIGIT, by type one I believe fern, leads to this massive cytokine storm. We don't know yet. We hope to know next week. So we want to examine the clinical trial with TIGIT agonists to potentially suppress the sighted oh kin storm -- cytokine storm. Click.

So the clinical and scientific observation -- scientific observation, so what happens in patients with severe Covid-19? They're inflammatory cytokines made by T cells. And here is some data from bioRx, published over the few weeks of the experience in China. One can see that this massive cytokine secretions on the right panel, they have no controls. The middle panel, non-ICU patients. The right panel, patients on ICU see massive amounts of T cells making massive cytokine [Indiscernible] in aisle six. Click. And in fact, these observation prompted clinical trials with an eye-IL6, presently ongoing. Next slide.

So then what about PD-1 and TIM-3? Normally helping individuals, the expression on T cells. If one looks at non-ICU or ICU infected patients, we see pass had I have expression of both TIM-3 and P1. Click.

So in it the last two slides, they're related to the scientific part. So based on humor and immunology, a hypothesis as to how the SARS virus and ARDS is formed. You have a healthy individual. This individual becomes I believe fixed with the SARS viruses. Click. And this leads to massive expression and secretion of type one interferon in the lungs. Click.

The T cells in the lung are then induced. Click.

to expression these co-inhibitory receptors, but perhaps less TIGIT. Click and that leads to exhaustion, but a dangerous exhaustion where they are inhibited, they should be inhibited with PD-1/TIM-3. They continued to have cytokine secretion with cytokine storm, which will damage the lung.

Next slide. But go back one. Okay. So now the question, experimental question, will TIGIT agonist decrease the cytokine storm and prevent the release of anti-inflammatory cytokines. As a physician-scientist, if a lab is doing basic experiments related to humans, we take that knowledge for a new problem and we're able to deploy it, and our focus as a physician-scientist, always what is the therapy that we can do?

Okay. So next slide, so now I want to talk about the jail investigative neurology program. Let me just say that I did not [Indiscernible] slides and she didn't see my slides. We both mined the gap. And in this program, we just want to show some overview of what we're doing very much on dealing with the issue of going from PhD to and transitioning back to lab. So we want to identify individuals, post doc supervisor for clinical residency in the program. Next.

So for the exceptional candidate with extensive research experience and excellent clinical record, because they each have clinical skills in a shorter period of time. Click.

The candidates must have a clear vision for their academic career. They must be committed to a career as a translational scientist. Click.

We had votes through the national residency matching program, two a year, for this program. Click.

And what can we try to cohesively integrate research training with clinical residency. Click.

Guaranteed funding through the NIH R25 program, which the Yale neurology is part of, which gives funding for PG Y four, neurology

residents, and gives us an additional year. We back that up with departmental funding if necessary. Next.

And there are three months of elective time in PGY-1 year for neurology residents. Click. And then 24 months of protected research during PGY-4 and PGY-5, with guaranteed funding through the R25. And just listening to Dean Brown discuss the ideas of mentored laboratory experience, I think this is very important for the investigator, the young investigator and the mentored laboratory where they have independence. They are their own project, but they're surrounded by individuals who can mentor them. Next slide.

And the technicians providing PGY-4 had. And perhaps most importantly, we should try to combine the scientific post doc with clinical fellowship, increasing requirements for clinical fellowships which really make it very difficult to decide the residency that one has to then enter into a fellowship program. So the idea is to do research 75% of the time and to spread the clinical fellowship out over a number of years. Next slide.

So basically, the goal of the investigative neurology program is to have individuals successfully compete for the NIH-series award.

Next, it's a pipeline for future scientists in the department. So thank you, all for your time, and I apologize for those who could not see the slides. They'll be posted. But just to say that we are really dedicating here at Yale for developing programs to be a transition from a residency back into the research programs. So again, thank you very much.

>> Thank you for going through some of the cutting edge research that you're working on right now. Very timely for trying to understand what is facing patients when they develop respiratory failure, and you're using your immunobiology expertise to try to tackle this program. So I'm going to move on to Sindy Escobar-Alvarez next, and we're going to see if we can have Dr. [Indiscernible] come on at the very end. So I am going to switch over to her as a present beer. But I'll introduce her first. So she is a senior program officer for the medical research program at Doris Duke charitable foundation. So oversees the clinical scientist development award and also the new physician-scientist fellowship. They have done some research that was published in academic medicine a couple years ago on the impact of the Doris Duke clinical scientist development award where they showed that getting that award was associated with becoming an independent investigator. As a scientist herself, she's studied the molecular mechanisms behind cancer biology. So I'm going to switch over to her as the presenter. We should be able to see her slides.

>> There we go. Can we hold on. I don't think we can hear you. Let me see.

>> Sorry.

>> There we go.

>> An I was muted.

>> No worries.

>> Yes. Okay. So Good Afternoon. And thank you for the invitation to share how the Doris Duke charitable foundation supports early career physician scientists. The Doris Duke charitable foundation works from an endow means to support medical research, including nonhuman animal studies. You can learn more about other areas at our website.

We support physician scientists to promote retention in research, help build a foundation for independence [Indiscernible] funding, and to support rigorous [Indiscernible] human health.

Our clinical support focuses on fellow to early faculty stages. On the left is a brand new grant for specialty fellows. It is an individual award, meaning that eligible candidates with can apply most directly. We're learning and eligibility for these awards, because the success rate is about 10%. There has been [Indiscernible] clinical scientists that started in 2016. This is an institutional grant, which means that only eligible individuals at the institutions collect it [Indiscernible] can apply, and it provides support to physicians so they can [indiscernible] by giving [Indiscernible] in the research capacity. For example, temporary expert hands, and keep the research going.

We have early outcomes, and they're being documented [Indiscernible] University of Michigan, and I'm ready to read more about them here. And then our oldest program is a clinical scientist development award. And it is an individual award. I won't focus on it [Indiscernible] in less object learned for this program.

The clinical scientist development award is a mentor award with a goal to support the transition to become an independent -- independently-funded research beer. Now, what have we learned from the clinical scientist development on award? First, we have a typing error. The number of final applications in 1998 in the blue bar, and note the staff in 2003 and 2004, which was the extension of the award because of the financial crisis at this time. So events like this can impact the award at specific times.

The success rate is the orange line. It's limited by available funds annually. Not being successful in the competition does not necessarily reflect the quality of the [Indiscernible] result of the limited number of awards.

We have also studied association of the awards. And having a PhD, in addition to an MD, being at a well-resourced institution, and I indicating at least 50% effort to research at the time of application, and having a publication record all correlate to successfully competing for an award.

Now, not all associations of award attainment are what we expected. From 2013 to 2016, only 5% of women who applied received the award. 13% for men. And we do not think this is a reflection of the qualities of vendor. There's something wrong here. So [Indiscernible] and review materials, and you can read more about this in the Lancet piece. And [Indiscernible] for women is the same as for men. So we see more problems [Indiscernible] of individuals from racial and ethnic groups and are working hard in trying to figure out solutions. So factor in the [Indiscernible] success with the competition that I shared in the previous one, meaning that you can be successful if you don't [Indiscernible] the award to be sure that your research is very [Indiscernible] I really ask you to put in your application and submit it. And finally, we know that individuals who receive the clinical scientist development award transition to independence. So again, blue bar is 80% of the recipients of the clinical scientist development award and go on on to receive NIH research funding. Six of 6% who applied in the -- 66% of the next tier did not quite make it. For comparison in number, it's about 60% [Indiscernible].

Now, I would like to address how we are supporting the community during the crisis. For applicants to on going a competitions, we are committed to supporting awards for this year in 2020. And we are seeking to learn how the pandemic will affect researchers and their needs and ways we might be able to help. That said, immediate priorities might change the response to the community.

For grantees, we are being flexible and we are honoring multiyear commitments or grants to span over multiple years, so we are committed to making those grants. And for the community at-large in New York City where we are based, we are supporting the Covid response, rapid response for Health and Human Services and the arts.

And I would like to end by asking you to help us help you. So you can help us inform our long-term strategies by sharing about your career and research challenges, as well as ideas for solution. We have a small ability to support non-research projects that help us address or

understand challenges facing physician scientists. And here you can see some of the organizations that we have supported and some of the efforts [Indiscernible] if a number of years now to help them come together. And we also support the [Indiscernible] journal, the study on the workforce physician scientists, as well as other organizations like the physician [Indiscernible] foundation, alliance, internal medicine, and American society for clinical investigation. And with that, I'll say thank you.

>> Jennifer, I'll give the control back to you. You should have the control back now.

>> Okay. Hello?

>> You should have the control back.

>> Okay. Great. And I just want to see if Dr. Kirsten bibbens-Domingo is on. She said she was on, but we can't hear her. Get my control back. Otherwise I'll have her try to call in. Just give me one moment to see if she was able to call in here. We have Dr. Bibbins-Domingo. How are you doing?

>> I'm doing great.

>> Let me increase the volume. Apologize for the technical difficulties. We've never had this large audience before, but we have now increased our number of participants to 500. So there should be people being able to come in. I hear that some people are still having some issues with getting on. I think there is a transition part. But I have your slides up here and are you able to see your slides or do I need you to describe --

>> No. I have my slides on my computer, so I'll just go through them and I assume you'll advance them.

>> Okay. Great.

>> Okay?

>> Okay. Fantastic. So let me introduce you. Again, so Dr. Bibbins-Domingo is at UCSF. She was the former chair of the U.S. preventative services taskforce. She wears many leadership hats. She is the PI clinical you know tight, founder of the UCF center for vulnerable populations at the Zuckerberg hospital. She is the nice dean for population health and health equity and the Chair of the Department of epidemiology and biostatistics. She has leveraged her epidemiological skills and modeling to try to understand the impact of clinical and public health I want certain on the outcomes of cardiovascular disease. She is also a scientist who has been inducted to the national academy of medicine, as well as ASEI. Dr. Kristen * *

you can take the floor.

>> Thank you for joining. I think the enthusiasm speaks to the large amount of interest in this topic. So I'm going to talk a little bit about our experiences at UCSF. We are an institution that has taken training of early career trainees very seriously and our institution that has a large number of training grants, as well as K awardees. We have a particular interest in the physician-scientist and all of the challenges that were noted at the beginning of this call are ones that we are actively trying as an institution to think of how we address. So what I want to do is to basically -- next slide -- talk about the things that are elements ever our programs -- of our programs that we think work and to show how that we've tried to use these to address the specific issues related to physician scientists in training. I will say that many of my examples are going to come from clinical translational sciences, not necessarily from the basic sciences, but I think the applicability is there for both, and I'll point out where we've made specific efforts to bridge across the range of ways in which physician scientists conduct clients.

So when I think of the elements who are important in the program, we've tempted in many ways on campus to nest our programs with a number of common elements that really can support the skill building and career development of trainees and to allow particularly students in training to have multiple on ramps to developing careers, whether you decide as a medical student or a resident or during fellowships to decide to pursue science as a part of your career, that there are ways to do that.

The second element I'd want to emphasize is that we believe that cohorts and strong cohorts that provide peer support and mentorship are critically important and give us a critical mass to support physician scientists, and then as an institution, we've done a lot of work in tracking and strategic investment. Next slide.

This is an example of how we think about just our clinical and translational training programs. You can see here across our undergraduate population through our faculty population, we have a series of programs that are designed to support individuals and each level of training. Many times these programs share common didactic, common skill building activities that not necessarily all of these people have every level of training participates in the exact ones, but we try to use the same type of contents adapted to the learner in order to achieve some of our nesting in these programs. What that mean is that some efficiency, we build out particularly skill building elements in each of these programs, and that as people join, for example, in residency or later in fellowship, they can enter and quickly get up to speed to advance the scientific trainings that they need. Next slide.

There's some examples for specific levels of training. We have many institutions thought about the year of training between the third and fourth year. We have many types of granted supports for this type of year of training. But we've also made some additional institutional investments. We were really thrilled to get an award from the NHL BI for -- to fund residency research training. We've actually been doing this on our own for a long time and we're really happy several institutes of NIH have thought to invest in residency training. This award funds win year of research devoted training and mentor experience to jump start research prior to fellowship, but the residency programs that participate in this at our institution are management, pediatric, anesthesia, lab medicine, and surgery, and they've had to rejigger working with boards to make sure certification happens. At the link the star program actually an early tape program and several of our early participants

have done well in that process to move to now an NHL BI [Indiscernible] who participate in the program as a prerequisite. And clinical fellows, it has long been the focus of our training.

[Indiscernible] on the next slide would be our strong cohorts and peer support. Oftentimes at institutions, we'll have several T32s, several types of intramural K programs. What we've always tried to do is to leverage funding for individual programs and then use some institutional funding to build out some infrastructure that could support a program across multiple training Granted. We've done this at the medical student level, at the clinical fellows level, and the faculty level, and I'll give you an example from the faculty level.

So we have what we call a K scholars program that began with the PTSA giving out intramural K award for several other intramural K awards. We've massively expanded this program so that now we have between 50 and 60 case scholars, including more than two-thirds of them who have extra mural cohorts from the NIH to participate. It's the Friday morning with us, they do works in progress sessions. They do skill building. They do grant writing, K to R transitions. And I think it's proven to be very useful. I think the secrets box in these programs is

the peer to peer support, frankly, and I think it has yielded not just support, but also more innovative science, and that's the type of thing I highlight here. These are Jennifer Lye and Elaine Ku, two junior faculty specialists. They even have their own OK awards. By participating in this program, they actually developed their own collaborative research project. They're together and supporting one another, but also interacting and exchanging scientific ideas. And this is an example. Types of K clients that we think [Indiscernible] ultimately, as all of you know who are physician scientists and have been doing this for a long time, getting funded is one thing. Staying funded is really about collaborative work and the way in which what brings joy into these careers is it's not doing this in isolation, but actually collaborating and syncing with other colleagues, which we try to instill early.

The last thing I want to highlight is tracking strategic investment. I think the environments has played a role in trying to think of where are the gaps and how can we shore those up? I'll give you an example of who types of programs that we've initiated in the dean's office. The first is the physician science scholars program. This is really for when we have someone in our midst that we think is really someone who is going to be stellar in a scientific Greer to figure out early how to provide that funding to allow them to jump-start their career as they're applying for those NIH grants. These are, needles to say, highly competitive -- needless to say, highly competitive. We don't give these out very offer, but we think those are important. Many of the outstanding fellows that we have in our midst or MS * * MSVPs we ever in our midst to jump-start them and get their career started.

A similar type of investment that's really focused on ensuring the diversity, talking about a work course, and this is also a very highly competitive program, Watson scholar's program to support a junior faculty who share the institution's commitment to diversity. This is possibility to determine, both of these programs require support from department chairs and mentors, but have additional institutional dean's funding to ensure that faculty want to make sure they're going to be successful in our institutions have the on the ground support and then the additional financial support from the Dean's office to do this.

So I'm going to ends my presentedtation now and thank you all for very [Indiscernible].

>> Thank you so much, and thank you for being a sport for dealing with all of the technical difficulties. And also, I want to thank our leadership who's working frantically in the background trying to get the number of people expanded to access the webinar right now. So I am going to go back to our presentation here to highlight some of the things that we're doing, particularly with the Covid-19, and then we're going to go into the Q&A portion. I want to thank everyone for their contribution to this semi-signature. We've had a record number of people signed up, close to 500 people who have signed up for this webinar now. They're listening in in case they couldn't gets in to the webinar. Rest assured, we will have the recording, as long as everyone on the panel agrees that we can share this reporting with them, they'll be able to hear the contents and they will also be able to see the Power Points. Additionally, because we had some participants who were hearing impaired, we also have a translation captioning active going on right now. So for those who are hearing impaired, they're still able to get access to this contents * *

So in terms of wonderful talks we've heard today, go back to the leaky pipeline phenomenon. So with the Covid pandemic, we've seen that research has been halted. We've seen that labs have been shut down. Clinical trials also have been halted. And then for some of the junior faculty members, they're trying to start their research be, but those are also now derailed. So the question is will this Covid pandemic actually lead to an attrition of physician scientists? And some of the news that we see coming out in the reports, like this one from Stanford, where the initial pandemic came out and the university was trying to reduce exposure for unnecessary law personnel, is some of PIs wanted their graduate students and post docs to come in, so there was some stress from that ends where the graduate students and post docs felt pressure to come in, even though they did not feel safe coming in if. But at the same time, you know, they also wanted to move their research forward, and now they felt pressure and stress that they couldn't move their research forward. So some of the stress experienced by our graduate students that are post docs are palpable in some of the anecdotes and the stories that are coming out. And for -- However, for some of the physician-scientist trainees and scientists that are out there, they have kind of stepped up to their calling and they converted nare labs or they joined efforts do tackle Covid-19. I bring you some examples from Yale and also Stanford where we have medical students who have been taken out from their clinical duties. Now they're signing up to help out with research efforts in terms of Covid-19. So this is from Chico Awasakez's lab at Yale. They're doing human studies looking at the immune cells in Covid-19 patients. And this is with their permission to post this. This is cytokine -- cytokine production from CD8T cells from patients hospitalized, versus at discharge. This is preliminary data. They're collects being more patients as we speak, and their goal is to try to identify certain immune signatures that may be associated with a better response, but this is ongoing work. And M departments PH students is helping out with some of these efforts

. And another lab at Stanford uses a computational pipeline to identify epitopes in co I had in 19. A PhD student is using machines learning to he model ipitopes to vaccine development. There are about 500 manuscripts in meta archive and there's about 200 plus manuscripts or articles in the bioarchive that are looking at SARK -- Covid. So the scientific community has tends up to try to address this pandemic. This is one example of a multi institute study. Yale is also part of this group, but medical students have stepped up to help with this project as well where they're using shotgun sequencing to identify strains of SARS-Covid-2. And this one is ports to the meta archive. They show that the train in Connecticut originated from Washington. They're very similar.

So we think that's correct thank the trainees and physician-scientists for stepping up to try to tackle the Covid-19 pandemic, despite a lot of stress that we're all feeling right now and to better success and quantify what they're experience and go how this may impact them currently and in the foreseeable future. We're doing the survey that's already IRB approved, thanks to Evan, that will be launched nationally to trainees, residents, fellows, and junior faculty to assess how this pandemic has affected them. Some of their current challenges. How they're coping, and also, whether or not some of these are virtual experiences for learning, virtual experiences for patient care, virtual experiences that substitute for clinical visits, whether or not they think it will impact them or impact their patients. And the goal is to try to identify challenges that are facing this cohort so that we would be able to anticipate and advocate for changes that may help improve their setbacks.

And in addition to launching this in the U.S., this is an international pandemic, and we will be working with our colleagues in Switzerland and our colleagues in France, U K, and Italy to try to assess what kind of impacts that science has had for them as well.

So these are some of the challenges, in had summary, labs being shut down for the graduate training stages, the clinical training at medical stages may be impaired. For the residents, fellows, and junior faculty, whether they've been calls to cover Covid-19 patients. We have physician scientists who are now covering Covid-19 patients. Are they protected? And have they felt an I think ordinary natural amount of

stress if they had exposure or now, you know, they are concerned that they're going to expose their family or for those who have had their research detailed? So for example, if they were working on heart filler transplantation, some of the heart transplants, essentially, have been stalled. So they cannot continue with their projects. But can they convert to a different project? Is the meantime? -- in the meantime? And bedroom the group that will work to find future disease insights and prevention as well. So can we actually leverage this Covid-19 as an opportunity to actually spur new progress and new therapies? We didn't have MSTPs during the 1918 flu. Technology and science has got to know much better since then. The yellow berets came out of wartime efforts and led to several Nobel laureates. As physicians and scientists, it seems like we've already been rising to the challenge of this pandemic. Will this be a silver lining and lead to the same? Or will trainees get discouraged due to tainted corruption in their research currently and leave science?

So with that, I want to thank everyone for joining the session, and now we're going to move on to the Q&A portion.

>> Thank you, Jennifer, for a great introduction, for the work on [Indiscernible] fellow engineer faculty Committee, and thank you to our esteemed panelists for their wonderful overviews. We're now going to open it up, that panel, for Q&A. For the participants, please have your questions into the yes box. We'll try to extend this to around 4:00 o'clock if the panelists are willing to stay on the call for that long.

So one of the first questions that we want to ask was to Dr. Collins. This was posted from Patrick Wu, regarding is the NIH considering expanding existing mechanisms and/or developing new initiatives and are directed specifically toward supporting physician scientists who have just completed training and are in the process of transitioning to tenured track faculty positions?

>> So thanks for this opportunity to be on the panel and glad to try to answer questions like that. I think Dr. Lund went through a long list of the kinds of mechanisms that we're using to try to nurture and encourage physician scientists, and I'd really prefer the questioner to look specifically at that. There are probably also questions about how Covid-19 affects this. Let me give you one other place to look. Our Director of [inaudible] research, Dr. Mike Lower, does a blog called open mic. If you go to open mic NIH and Google that, you will see both some text and a video that he's made describing all the things that NIH is doing now to try to be flexible about the consequences of Covid-19, particularly for trainees, as well as grand holders, and that might be a good source for people to figure out what does this do as far as deadlines they might otherwise be facing. We want everybody to be able to continue forward with their training program, even with an interruption of this sort, with the confidence that we will get through this and we will get people back on track.

>> Okay. Great. Thank you. So a related question is, is there any interaction between the NIH and scientists and economists to figure out a plan to reopen the economy quickly, but safely?

>> That's a great question, and we have a big group right now that's looking on this that I've just actually put in place a couple of weeks ago.

>> The economic consequences of what's happened right now are obviously severe. You look at all the people who are now out of work. We also have to think about the health consequences of the economic shut down. We, of course, as physicians and scientists are particularly worried about the health of our families and the big part of that that's right in front of us are the risks of infection that this coronavirus and the illness and disease, in fact, have caused. We also have to think about the health consequences of people being out of work in difficult circumstances, mental health problems no doubt being accentuated by this. We have to decide, when is it safe to reemerge from where we all are and balance the risks of a second wave of coronavirus, which is really going to be a serious issue versus the risks of continuing to stay sequestered and having some of these other health consequences go forward, also, in very negative ways. So we really need good health economics to try to assess that, and that work is under way.

>> Okay. Good.

>> Next question?

>> There is a question, sorry to put you on the spot, Francis, a question that many of my K awardees are asking me. Their labs are shut down. Their K awards are moving on. Is there any discussion about extending K awards and providing more you understand iting with this -- funding with this crisis in front of us?

>> Absolutely. And again, I would encourage people to look at that open mic blog. It's sort of taken from a guide notice that goes through all of the things that we are currently doing, but it's in a very accessible form. Want everybody to have a chance to look at that. We do want to provide that kind of flexibility and extension at a time where many labs, of course, have ceased working.

My own research lab on the NIH campus is dark and empty right now, which is heart-breaking for all the people doing that science on diabetes and on progeria. But it's the right thing to do to keep everybody safe. We just don't want the consequences for that of trainees to be more severe than they have to be. We're going to do everything we can to try to protect their grants.

>> Great. Another question was a little bit separate from the Covid crisis, was regarding training itself. Now, we know that a lot of programs are now graduating in terms of residents. Medical students early to -- med students early to start internship and start caring for Covid patients. So one question was, number 1, should that type of program be the case for a lot of medical schools where fourth year medical students can graduate early and start treating Covid patients? And how, when that type of system affects graduating residents and or scientist residents who are getting involved in research early on and training? That would be a good question for Dr. Brown.

>> --

>> You might be muted, Dr. Brown.

>> It's a really important question. We have not chosen to do that here at Yale, and one of the issues that many of our graduating students will be reporting elsewhere for their internships, and so they're not currently on campus. And we are finding that the limitations of personal protective equipment, we don't really have the capacity to have more healthcare providers at the bedside. So [Indiscernible]

>> Captionist: We have an echo.

>> [Indiscernible] scientists, except that whenever our physician-scientist is seeing patients, I hope we notice the outliers and our curiosity is sparked requesting new questions that we then take back to the lab.

>> Okay. And do you think that this will make the medical school admission process overly competitive because many applicants might be delaying their 21 applications?

>> I hope that what this does is encourage people to pursue a career in medicine and to pursue a career as physician scientists, because we want the best and the brightest. So if the interest in Covid and pandemics and public health increase the number of physician-scientist applications, that's terrific.

>> Okay. Great. There were some questions regarding specific mechanisms aimed at supporting non-traditional physician scientists, such as social scientists and the humanities. Dr. Collins, can you speak to if those types of resources will be expanding at this time?

>> Well, certainly we're very interested in supporting behavioral and social science research. It's critical if we're really serious about figuring

out how to help people maintain a health span, if you will. That's a lot of area we need to understand better and figure out how to better motivate people. So yeah, we are very invested in that. I don't know that I would say we're going to change the ratio of behavioral and social science versus the other things that we support. I hope everybody herds at the beginning, though, that we are in a very positive trajectory right now for the overall support. So everything is going up alongside of everything else with our 40% almost increase in dollars for M. NIH over the past five years, with Congress seeming to take the view that this is a pattern they'd like to continue where we have stable, predictable increases for support at a time when there's so much talent, so many needs, so many opportunities, and the search. In he get

it. This is true in both houses and both parties in a remarkably bipartisan way. Medical research happily seems to be one of the last remaining topics that the politicians all agree about and they continue as long as possible.

>> Great. And a related question --

>> Sorry. Just to chime in on that. I really think all the advocates that have been coming to the hill to ad slow skate for biomedical research, because prior to the 2013 sequester, there wasn't that bipartisan support of NIH funding and biomedical research, but it was after that 5% across the board cut that the patient groups started coming in. All the special at this society groups started coming in, and so it actually does matter whenever you go to your house of representatives or Senators' office. They do tally the number of people who go there. So I encourage everyone on this call, people who are listening out in the internet sphere that whenever you hear from a specialty society to help with advocacy, it actually helps. They do count those numbers. You're their constituents and your voice matters.

>> Absolutely, Jennifer. Glad you brought that up the other thing academic centers can do, once we're all free to start moving around again, is be sure to invite your elected representatives to come to your institution and see what's going on there. It's one thing to meet in their office and tell them about it. It's another for them to come to a places that's right in their own state and see a spark in somebody's eye who's really made an interesting observation in the research lab, and that is what they remember.

By the way, it's not any particular coincidence that one of the reasons NIH supports has been doing pretty well in the last five years is the current chair of the appropriations subcommittee that oversees the decisions about that is Delaro, who represents new haven, Connecticut. I had to say this.

where the network is already capable of doing so. You could do faster. If you don't have those agreements in the network, it would be better to go with the standard approach. Either way, in this circumstance that goes fast is going to be the right answer to that.

>> I see.

>> Well, Kay, do you have an update on that?

>> As far as I know, the June 1 deadline is not going to be extended, but again, it may be something we should have more discussions around.

>> Okay. Great. Well, maybe we could shift gears a bit to get questions to Dr. Hafler. So I'm wonder being --

>> I regret I'm going to have to sign off, because I have a conference call at 4:00 o'clock and they're probably wondering where I am.

>> Okay.

>> Thank you for coming on, Dr. Collins. I know you have a very busy schedule.

>> It's a little crazy, but I was glad to be a part of this. Thank you all for what you're doing.

>> Thank you.

>> Me, too. I have to sign off, also. Sends questions if you need to.

>> Okay. We'll do it. Thank you, Kay. Appreciate it.

>> And Jennifer * officer, it's 4:00 o'clock.

>> I can go on for a little bit more. So for the remaining, how many more questions do you want to ask?

>> Two or three more questions. In terms of hiring junior faculty who are finishing residency or fellowship, what are the two most important factors you look for for them to be successful and for you to hire them as junior faculty?

>> Well, thank you for the question. What I look for more than anything else is a passion for doing translational work. They will almost certainly have eye track record where they have been successful, be it as an Epidemiologist, as a scientist or clinical scientist. They're individuals who have demonstrated success along the way in terms of their research training. Usually by publications and not necessarily where they publish, but showing that they're doing independent work and ready to transition and mentored environments where they begin to take off and develop their own programs. But I really just look for per passion to succeed and really a desire to do something that's important and someone who can see the most important question, who doesn't get bogged down with details, but can be a vision about where to go with their work.

>> Okay. That's great. And in a related question, for medical students who are approaching residency who might apply for your business design training program, what steps can they take at the MS3 or MS4 stage to protect against that trickling effect. [Indiscernible] when they get into residency and fellowship?

>> Well, that particular -- our investigative neurology program is particularly for MT PhDs to help with the transition. We are really combining the post doc, along with the clinical residency. And we ask them when they come to the interview to identify potential mentors who want to take them on. So they can't find a mentor, then they're unlikely to have success.

Now, also, [Indiscernible] training the non-MD-PhD who decides they want to do research. I have someone, a resident who became very interested in inflammation of the nervous system and she received the R25 award this year, which is an incredibly useful award for [Indiscernible] and she will join my laboratory as soon as this crisis is over and plan to work for two years, and if successful, will continue on and hopefully transition into a K award in a faculty pox. But as a medical student, the most important thing is use your summers, use your free time. Get involved in asking questions, learning how to ask the important questions.

>> Thanks so much. Doctor Escobar-Alvarez still on the call?

>> I am here.

>> Oh, great. Well, I was also going to ask you a question from one of our attendees. [Indiscernible] the private sector in supporting physician-scientists, and I'm wondering whether you have an opinion about how that might be changing now with the Covid crisis, maybe with stagnation in the federal funding, and how private foundations may take over some of that role.

>> I'm glad you're commenting -- you were braking up a little bit, but -- breaking up a little bit, but I think I heard how will funding from philanthropic organizations be different because of the epidemic? I think that there definitely, as with every industry, they're being impacted

[Indiscernible] something that we have is that we can respond rather quickly, but a disadvantage is that we do have limited dollars and organizations like Doris Duke and other foundations depend on endowments. The impact of the economy also impacts us, so that can change the priorities. I think at the moment from discussing with other nonprofit funders, if you haven't heard of an organization, I would recommend checking out the website for the health research alliance. The members are [Indiscernible] about 80 of them. And the conversations of my colleagues there, we're all trying to be very flexible, but we are also thinking of ways to help be supportive when everybody [Indiscernible]

it has been discussed. And we're looking closely at how the national I understand students of health are doing to figure out, how can we support, particularly those we are supporting already. We're currently allowing researchers to charge salaries, Fox, for the staff. Even though the research is not happening. Probably depending on where this one comes from. Nonprofit at charities that brings from the public, might also be affected by this. Fundraisers are not happening now. You can see the difference between foundations getting response from public charities.

>> I know that salary support for people funded by these grants is so important during this time. All of you, all the foundations are continuing to support people's salaries.

>> Jennifer, I can give it back for you now so you can click the session.