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WEBINAR

A PROPOSAL FOR LONG-TERM COVID-19 CONTROL

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P R O C E E D I N G S

MR. O'HANLON: Greetings everyone. I'm Mike O'Hanlon with the Brookings Institution and I have the particular privilege and pleasure today of having a conversation that we'll bring you in as well with Dr. William Haseltine who is, to my mind, one of the great living scientists on earth and one of the most accomplished philanthropist and lifesavers of our day.

He is, as many of you will know, one of the key scientists on breakthroughs for HIV AIDS understanding and treatment several decades ago and therefore, as I calculate it, has had a direct hand in the savings of millions of lives around the earth. He is also the president and chairman of ACCESS Health International, which is an organization that promotes health in various developing countries all over the planet.

He has been associated for a couple of decades with Harvard Public Health School and Medical School there, done countless other kinds of research, and you can see some of his books behind him including "My Lifelong Fight Against Disease." And then a recent book on how to handle COVID and it's really a practical guide as much as it is a science's explanation of what's going on.

We're here to talk today about COVID. And Dr. Haseltine's paper that's on the Brookings' website, you can easily find at Brookings.edu, a very readable and digestible paper that has, to my mind, just the right amount of science to help understand and bring along the reader, but is easily accessible and digestible in a single sitting. And I think basically proceeds from the position that we still are not taking this virus quite seriously enough and not doing nearly enough to deal with it. Either in terms of our immediate wellbeing or the longer term.

But in a second here, I'm going to stop talking and let the expert explain to you, first of all, his assessment of the situation and then the four-step plan -- four-part plan with each of those parts having a number of components within that he advocates for how we should be thinking more rigorously in dealing more rigorously with the COVID challenge today.

So first, Dr. Haseltine, welcome. Thank you. And we're honored that you also are a trustee at Brookings. A real privilege for all of us who had the chance to spend time with you over the years and really grateful to you for joining us today.

MR. HASELTINE: Thank you, Mike. It's been a real pleasure. Also, watching your

career grow. I remember I've been associated with Brookings now almost 25 years and I remember you as a young guy just starting out and one of our brightest stars. And it is tremendously gratifying to see your great promise come true and help the situation and help the United States in a very difficult and transitional time.

And also, it's just been a wonderful association with Brookings. The people, the scholars, the fellow board members, the ideas that we've seen, the places we've gone and the impact we've had on foreign policy.

I did have the great privilege of working with your president, John Allen, on a proposal for a commission, an AIDS one that the British have just finished right now. The parliamentary commission, which has come up with some pretty sobering results. And I would say, I wouldn't mind to be at the other end of that lash that they've reeled. It was a tough report as ours should be.

I might say it would be a tough report not only from the administration but in some respects for the current administration too which is a little bit concerning because these guys have their heart in the right place.

So let me just begin by asking a fundamental question. And that is, is this an accident? Or what's happened to us? How did it happen? And I think the answer is we, humans, now weigh heavily on the earth. What I mean by that? So when I was born there were two billion people alive. There are eight billion people now.

When I was born 80 percent plus people lived in the countryside. Eighty percent plus lived in the cities. We're a new ecosystem. We're a new ecosystem from microbes to exploit. We're a big, fat juicy target that a lot of us, we live close path and we travel like crazy. I saw that first with HIV AIDS.

It obviously had been in Africa for a long time. Why did it get out? And it has killed 37 billion people by now. It got out because we started traveling and interacting. It isn't that we encroached on the national environment. We've done that forever. You know, go back to our hunter and gathers. We are up there, right there in the wild. They said we are now a new ecosystem.

This is not the first, it's not the last and there are going to be many more and increasing frequencies as microbes discover this great new food source. That's us. And we better get used to it and

begin to think very seriously not only about this pandemic but about pandemics to come and how we're going to lead our lives. We are living on a volcano and we've better listen to it rumble because the natural world is out to get us that's what it does.

Read Darwin. Darwin will tell you that's the nature of life. And we're a great new ecosystem so it's not a chance. Now, what has actually happened? When you look at what's happened in earth, what we might have been able to do. Michael alluded to the fact that in my view we've underestimated what's it about from the very beginning until this very day.

Where are we today? Well, if you were to read the papers as I did the morning. You would say that COVID is on its way out. When you look at the numbers, I just jotted down some numbers. They're about half a million people infected every day. There are about 8,000 of us who die every day. The infection is not going away in many parts of the world.

If you look at countries that have controlled it like New Zealand, Australia, they don't control that anymore -- or Singapore. It's out of control in those countries. And it's a very, very big burden. You can even look at the U.K. The U.K. has more vaccine per capital than we do and yet infection rates are going up. We're not out of the woods.

And when I look at our own country, looking abroad has been a foreshadow of what happens in our country. Britain did go down a little bit and it just kept going up and up and up. And it doesn't look good in the U.K. today. It looks bad.

If you want to see some place that looks really terrible, look at Russia. And that's only what we see. We get great reports as there's less going on. So we're in the middle of Year Two, almost Year Two of a really serious event.

And if you actually stand back and say is this really that bad? You say, well. And I've talked to my close friends and they'll say something like we do pretty well at handling this infection. Maybe one and half percent of us die. So our bodies are really fighting off pretty well. And most of those people are old. They've already had their children. They've already supported their grandchildren so this virus could be a lot worse. And in fact, they're not wrong except for the fact that there's something called long COVID.

So we count the dead. We don't count the wounded. And it's like a modern battlefield

today. It used to be a ratio of like one to one or two to one or three to one. The modern battlefield is ten to one at least for our terms. And it has the same kind of thing is true for long COVID.

If you're actually looking at the future disease burden and present disease burden, whether it's 20 or 40 percent of people even having mild COVID, it's a serious problem. So the magnitude of the problem that we're looking at is that people who are dead, which is still a horrendous in the U.S., 700,000. It could be ten times that number of people who have long COVID or some serious symptoms.

And our healthcare systems say, my goodness this is bad. Look at what is coming at us in addition to the AIDS wave, we have a COVID wave. So this is a serious event. And, Michael, I'll stop with my brief introductory remarks there and then you can take me through or structure the presentation if you would like.

MR. O'HANLON: That's fantastic. Although, it's obviously foreboding and frightening as well. And I guess before we get into your detailed proposal. I wondered if you could with whatever crystal ball you might have handy sort of prognosticate for us where you think we might be in a year under current policy, the current approach at home and abroad?

And in terms of whether you want to say how many fatalities per day we might be having in the Fall of 2022 or some other metric. Whatever occurs to you and you find most compelling. And then with your plan if it works as well as you would hope. I realize there are a lot of dimensions, a lot of uncertainties but if much of it worked as you hope just in order of magnitude terms how much mitigated might things be in a year relative to the baseline that we're on as it is?

MR. HASELTINE: Well, let me give you an answer to your last question. One fifth of humanity has been free of COVID deaths for 18 months. No COVID deaths. And that's China. Now, you might say they're not reporting a few. Well, let's give them a hundred. Give them 50. Give them 10,000. You say surely it isn't 700,000 dead, okay? And it's close to zero. I have offices in China. It's close to zero. Human beings can control this.

So the answer is if my plan were implemented, the death rate a year from now would be zero, close to zero. What is the chance that that's going to happen? Close to zero because we don't do well. The fundamental aspect of COVID is in every public health book.

You know, the one thing that people may not realize is when SARS hit China, they looked around the world for help. And where did they come? Harvard School of Public Health. And some of my former students ushered them in to the hallow halls of Harvard and for ten years they sent their top people over every summer for workshops and we went to their Central Party School and wrote the book on how to control a pandemic. And guess what? They followed it to the letter.

Yes, there was a glitch at the beginning which has cost them and all of us a lot of problems. But once they realized, federal government realized what was going on. Whamo. They just executed what the plan was. I can't tell you how it breaks my heart to realize the plan we wrote works, but we don't use it. And what's that plan?

It isn't rocket science. It's find out who's infected. Contact trace everybody who was infected. And treat them whether they're infected or not as if they are infected because they might be. Which means isolate them from everybody else. And if it means isolating a whole city for two weeks. If it means testing 10 million people in five days, they will do it.

Do we have the capacities to do it? Yes. It's not technical. It's not complicated. Yeah, we have apps, we have this, but we didn't do it and we won't do it. That's the problem. We see this example. And everybody says so they're authoritarian. Well, that's a group thing. That is not what I see happening. I see a government that followed the rulebook and I see people who are willing to sacrifice their temporary inconvenience because other people will do that for them. And the outcome is China is virtually COVID free.

Now, yes, COVID keeps coming in. So first we're shutting down Ningbo and then Shenzhen and then Harbin and then Nanjing. Yeah, they're whacking them all, but they're keeping it low and people are not dying. Can any country do that? Yes.

What's going to happen to us is we're going to continue to suffer from repeated bouts of COVID. Just like take a look. I urge the people who are listening. Go on and put into your computer COVID cases U.K. And look at what you'll see. You'll see they've gone through terrible times. They're going through bad times now and it's on the way up despite all of the vaccines.

That's because they're not following the public health rule. And that's true. Look at Singapore, they controlled it. They relaxed, whamo. Higher than it's ever been. New Zealand, relaxed.

Higher than it's ever been. Australia, relaxed. Higher than it's ever been. Not that these countries didn't know what to do. They just decided not to be vigilant.

MR. O'HANLON: So let's go through the --

MR. HASELTINE: We aren't in good shape going forward. This virus is complicated. And there's a question that you asked before we talked back and forth. It was how badly did we underestimate this pandemic?

First of all, just to list a few. We thought it would stay in China. Of course, it didn't. We thought it wasn't very lethal and it turned out to be a lot more lethal than the flu. We thought that our very sloppy border controls would work and they didn't work. We thought it wasn't airborne even though the highest level in the Chinese government thought our highest level of government that it was airborne.

We continue -- and even today continue to assume it's not really airborne when Delta is even more obviously airborne than other things in, you know, somebody opens one end of a hall opens a door, half an hour later another guy in isolation hotel opens the door. The other guy gets infected. The same sequence of the virus. He gets released, infects a whole bunch of other people and about a third of Australia shuts down. That's how it happened. You can actually trace the virus.

One guy walks through a shopping mall and 20 people get infected and infect every other people. That's airborne. So we know it's airborne. It's not going to change. Don't worry about it. Do you remember that? Now, you've vaccinated. You're protected. No. You're vaccinated. You're not going to die. Maybe. We don't know. But we're basing policy on that assumption, which I think is a bad idea.

So we've underestimated what this pandemic is and translated that into policy. And when you read what the British government, parliamentary commissions, have said. They say this is a great example of bad group think. They all drank the same Kool-Aid and came to the same bad result which has resulted in hundreds of thousands of our fellow citizens dying. That's the British report.

MR. O'HANLON: Well, let's go through your four-point plan and see how much we can convince some listeners to adopt at least some of the -- I assume some of it will be better than none of it.

MR. HASELTINE: Absolutely.

MR. O'HANLON: So --

MR. HASELTINE: Yes, Mike, that's true. Some is better than none.

MR. O'HANLON: So you've got vaccines.

MR. HASELTINE: All is better though.

MR. O'HANLON: And just to sort of telegraph in advance. Vaccines and also the microbiological research to understand the virus better so as to make better vaccine and other things Category One. Antivirals and prophylactics, Category Two. Public health including things like contact tracing and isolation with compensation. And so, people don't avoid that, number three. And then a global element, number four.

So again, vaccine. For shorthand, vaccine, antiviral, public health global strategy. I'd like to walk through each of those and ask you just to say a couple of words about each. And again, I encourage folks to read the paper, but maybe you can highlight some of the key recommendations, you know, just going one at a time. Starting with the vaccine and research issue if you could please.

MR. HASELTINE: Right. Well, you know, vaccines are a wonderful story. Just in public health in general. It's the cheapest, best most effective public health tool we have. Other than what I just discussed with the Chinese have done without a vaccine. They have one now, but they what they did without the vaccine.

And the new technologies have allowed us to make these vaccines superfast. But one thing I knew from the inside ballpark is these vaccines weren't going to last very long. They made these vaccines, same ones, in MRNA vaccines against Ebola, Cytomegalovirus and others. And we knew three months, six months that was it.

And by the way, that's true for flu vaccines which we've recently discovered. They don't last very long. The current advice is if you want to be protected in February take them in November not in September. That isn't official government policy, but that is I think the upshot. The vaccines fade in their effectiveness.

And so, that's a fundamental thing you have to know about vaccines. Yes, if you have high levels of antibodies and you have a very good fit with what's infected you that high level of antibody won't stop the virus from getting into your body, but it will stop it from doing anything more.

But if that level fades and the same thing comes in. You get infected again. Or if this

changes and you have a high level, it still can get in. And once it gets in, it can cause a lot of trouble. Whether it is going to kill you is a whole other story and we don't know the answer yet, okay? But one thing we do know is you will get infected. You will transmit the virus and you will get at least mildly ill and some people will go to the hospital. How many go to the hospital and how many get sick? Time will tell.

The simple answer to the question of what to do then? Is keep those antibody levels high and that's what third, fourth, fifth shots are all going to be about. And if we get more clever, it will be about broadening the protection. So if the virus changes a little bit if that's what it's doing to get back in like flu virus does then you make a slightly different vaccine.

And all this question about which vaccine should I use? Should I use Pfizer? Should I use Pfizer and that? I ask you a question, those of you who listening. Who made your flu vaccine? Who made the one before that? And the one before that? And the one before that? You don't know. I don't know. Who knows? Okay? So of course, you mix vaccines. We've been doing that forever. Same thing with all your vaccines you've had. They're all mix and match. So I wouldn't worry too much about that aspect.

So vaccines are the one thing we can do. But the policy in my view should be keep the antibody levels high for everybody you can do it for. And that means repeated doses of the vaccine. You know, this really should have been a three-dose vaccine, the Pfizer and the Moderna because if the first dose gives you a protective level of one. The second a 10. The third is a 100.

We didn't have time to do the three dose, nine months regimen. Had we had the time that's what it would have looked like. Now, we're saying, well, maybe some people get the booster and some people don't. I call that a decision to regret. Kind of like the captain of the Titanic steaming full speed ahead. It's not a smart thing to do. You're betting against the unknown when we've lost every one of those bets.

Okay, so the first thing is vaccines and are we going to have better vaccines? Yes. We're going to have vaccines in higher levels of protection. They give you broader. Is that going to solve the problem? No, because these vaccines will fade, and the viruses will change. So we're going to have to keep going. Whether it's biannual, whether it's annual or semiannual is the only open question at this point in terms of vaccines. But yes, vaccines are a very powerful tool that we should take maximum use

of.

Okay. So that's the first point.

MR. O'HANLON: Let me ask two related points on that issue before we move onto antivirals. So one question would be are we ramping up production capacity for vaccines enough to essentially comport with your view?

Do we need just to -- whether it's through incentives to the private sector or, you know, suspending patents or something else to just get the production levels up to a much higher level. I guess let me just ask you that question.

MR. HASELTINE: Okay. Well, the answer is the world does not have enough vaccine production capacity. And we should be ramping it up dramatically here in the U.S. I know the Chinese are now doing their MRNA vaccines. Indians are doing MRNA vaccines. I wish other continents would be doing that, South America and Africa and Central Asia. We need a lot more vaccine capability.

One of the things that is the biggest regret of mine is it isn't for people like me, knew that this was going to happen. We predicted -- I predicted it after HIV, but there have been many, many predictions all the way along the line. And, Mike, you'll remember after the anthrax attack. All the virus shield, the Varta, all the effort that went into that. But nobody took it really seriously. They just didn't.

And if you look at vaccine capacity around the world, Continent Africa may have five vaccine production facilities. And they are not very modern and they're not very good. And South America may have five. Those are big continents with a lot of people, and they're not protected. And that is just been a systematic problem not for America but for them. Yeah, they can point their finger at us and say, give us the vaccines. They've got to do it themselves.

Now, maybe you're talking about PANS. The way the problem got solved for HIV drugs isn't (inaudible) patents. It's by saying there's exceptions where you don't have to call the patent rule. If you're an emerging economy and that's actually built into the trade agreements, the world trade agreements that you can have exceptions if it's an emergency for your country. You can make the drug without paying attention to the patents.

For example, Egypt has recently taken a drug that in the U.S. cost $80,000 to treat Hepatitis C and cure it. Not just treat it, cure it. They have the highest per capita in the world by far.

What cost us $80,000 cost them $45, okay? And they manage to get a ruling that they didn't have to follow the patent. So it wasn't they were giving the patents. They declared we're not going to follow the patents according to these rules. And it cost them $45 per -- and they identified by testing with the latest advances, with PCR. Who is infected? Treating them all for free with a $250 million loan from the World Bank, and they have no more Hepatitis C.

So you don't need to hand over the patents. You just have exceptions where people don't necessarily have to pay the patent rules if there's an emergency situation. It already exists. So what we should do in these countries and do need is the vaccine manufacturing capacity.

MR. O'HANLON: Now, you also mentioned -- last question on the vaccine. You mentioned research and development to better understand the microbiology of the virus that causes COVID-19. And I wonder how do we implement that recommendation?

Do we need to provide more government funding to university research facilities? Just how does that get followed through?

MR. HASELTINE: Well, you know, if you take -- there's a direct line from fundamental research to applied progress. Let's take HIV and we'll go from HIV to COVID in a second.

I was able to do the work I did on HIV because we had 20 years of something called the Special Virus Cancer program, which gave us recombinant DNA and gave us a deep understanding of retroviruses even though there was no evidence that retroviruses caused human diseases.

I actually thought maybe they did so I kept the lab going on that and it was one of the only labs that they did not let all of use was knowledge that came from the Special Virus Cancer program. Twenty years of heavy investment by Republican and Democratic governments that led to our ability to know what that virus was, understand it in detail and then two and half to three million dollars from 1987 until today of consistent research. Where has that led us?

There's not going to be a vaccine in the foreseeable future for HIV, but there are combinations of drugs which should be available within a year or less which I give you one shot and you're infected that's all you need. One shot every six months. And if you have a lifestyle that's likely to predispose you to catching HIV, one shot will prevent that too, the same shot.

But that took 30 years of fundamental research to get drugs that have what they call a

therapeutic index, i.e., kills the bug and not you. And so, you can load somebody up with a million times the dose needed to kill the bug and it might last six months. There are two drugs like that now. Fantastic progress. We can do that but it takes huge investment. All the research we invested. Those $3 billion a year plus whatever the pharmaceutical companies did pays off for COVID. We know what to do.

And not incidentally, almost all the molecular biologists and half the endocrinologists who work on COVID were previously HIV researchers. It's directly translatable research.

Do we have the programs right now? I haven't seen the kind of program I would like to see, but I think it's just because I'm not sitting as I used to at the right elbow of Tony Fauci as we're planning out what kind of grants to give out. He knows what to do. I have great confidence that he's done it before. He's done it successfully. Our government is really good at this kind of thing, but we really need to do it.

I haven't seen the papers but I would like to see some coming out, but I think this might be a matter of time. We do need to keep sustained fundamental research on Corona viruses and a few other viruses also.

MR. O'HANLON: So thank you. And now, let's move to your second key element.

And that is antiviral and prophylactic treatment and a lot of people, obviously, mistakenly have thought that, well, that was something we did temporarily until we got vaccinated or until vaccines became available, but you're saying no even in a world of plentiful vaccine, you want to have antiviral treatments which are different and work differently and achieve other benefits. So could you please explain a little bit about that.

MR. HASELTINE: Well, there are two -- antivirals are obviously two things. If you're sick, you give people the drug and they get better. That's what we hope or they never get sick.

Or you give it to them so they never get sick. They never -- for example, all of us have gone to malaria drug. And I'll say we have at least thought about am I going to take the antimalaria drug? We might not have done it, but we certainly have thought about it, right? And I know you've been in the Congo and so you certainly thought about it maybe you did it, okay?

We're not going to ask you to truth or consequences here.

MR. O'HANLON: I took all my antimalarial drugs.

MR. HASELTINE: Okay. So you have that protection for two years, okay? But be that as it may, the idea of prophylactic drugs is a powerful (inaudible). And because we don't have the prospect of a vaccine for HIV, we may some day get it, but it's been some day is 40 years gone by already.

We rely on drugs. And so, thank goodness, we have them. And thank goodness, we now have prophylactic drugs as well. So that is a whole body of knowledge. And we know exactly you have to use combinations. You have to use -- you sort of find unusual targets to get a therapeutic index so, you know, make SEL as well. So we're on the brink of getting some good ones.

Now, we already know it works because long-term antibodies are kind of a mimic of what a vaccine will do. We've made those. We have given those to people in congregate living settings, old age homes or, you know, in other leading care homes and shown that if somebody gets infected, other people aren't getting infected if you protect them. That's ideal.

The problem is right now is that there are two problems with monoclonal antibodies. First of all, right now you have to infuse them. So essentially, it's a shot. They're going to solve that. It's going to be a shot or subcutaneous. And they'll work it out and it will work for five, six months. But there's a deeper problem that is if the virus is mutating response to immune -- your immune system, it's going to mutate in response -- it's going to mutate in that response. And the monoclonal antibodies aren't going to work anymore and that's what's happening.

The virus does mutate to get around our immune response and it's exactly because you take the antibodies from infected people. There are now ways of getting other kinds of antibodies but that isn't the ideal. The ideal is (inaudible).

Now, we're going to have those. And over the next X years, and in fact that X could shrink depending on government investment. And we see how fast it can shrink when there are billions of dollars handed out to make it shrink. This is a very good lesson by the way. It's a super lesson. One of the most positive lessons we've ever had is you put in enough government money out there and a seven to eight program shrinks to eight months. It's fantastic.

And we knew that from the war research anyway. Radar that may have never come, zippo, came really fast. So we put a lot of government money somewhere, you either get really good

results or you put the power of the government to make sure they get tested, fantastic. So that's a lesson. We're not doing that. I've advocated for a warp speed, not a great name, but a warp speed effort on antiviral drugs. And I haven't seen it. There's some money there but it's not a warp speed effort where you're having very directed effort like with the vaccines.

So why do we need them anyway? We know the vaccines aren't perfect. We know even if you think you're going to be protected, you're not. First of all, if you're older like I am, you'll never make as good a response. In every textbook it says, oh, you've got great responses unless you're old. Or you have any of 10 different, 20 different underlying inherited predispositions. And we know that pretty well.

So vaccines are never going to protect completely. A little bit yes, but perfectly? No. I would like to have drugs that if I'm exposed, I can take or if I'm in situation like I was in New York where everybody around me was getting infected, I loved to have prophylactic drugs because I can't count on vaccines 100 percent. So that's the first thing.

Second of all, if you know you're exposed -- and this is what I'd like to see. What is the problem with testing identification, contact tracing and control of those who are exposed? It's who wants to change their lifestyle. Let me again take you back to HIV days. Before there was a treatment for HIV, nobody wanted to be tested.

There was a huge fight. Don't test me. Why? First of all, it's a death sentence and second of all it's the end of my sex life. So that was not a good thing and people -- they really resisted. The moment there were drugs to treat it, people wanted to be tested. Oh, I can save my life. Change flipped around completely. I was involved with developing tests so I knew in the field what was happening there.

So if we have drugs people are going to -- maybe are going to want to get tested. If we have good tests. And, in fact, the consequences will be identification. Test a lot of people. Contact trace. And instead of isolation for two weeks, pop a pill. That's a much better outcome. And by the way, if you pop a pill, you're not going to get it even if you were exposed.

I think we need that. We don't have it. It's got to be really safe because you're treating a lot of people who aren't infected. You're treating healthy people. Ninety-nine percent of the people you're going to give that pill to are not infected. It better be a safe drug.

And by the way, the new drug will Molnupiravir is not that drug. It has a potential of mutating. It can't be used for pregnant women for sure. And it may supercharge the virus variance. It's a mutagen for the virus. It mutates the virus to death. What happens if you have too low a dose? It's going to mutate it and it might kill a lot of other people. So that's not a drug I like, but there are other drugs that are coming along that I don't think will have those problems. But that's a long answer to your question, but I hope it helps.

MR. O'HANLON: No, it's great. And what is the most important next step there for in the research realm just given where we are in this whole process and the quality of the existing drugs versus what we need?

MR. HASELTINE: It's a lot more research and a very focused government effort to pull those drugs as fast forward as we can. And I can tell you looking at this, I've been studying it now for a year and a half, this virus is absolutely rich in targets.

This virus -- you know, your body is doing a pretty good job. Remember in HIV, 99 percent of people (inaudible) died. Ninety-nine percent of people died. That was a nasty son of a gun. Is a nasty son of a gun. One percent of people died with this one.

Your body is really doing a good job. The virus is sort of cranking along trying to struggle its way through. There are a lot of vulnerabilities. All we have to do is a little bit more and the worse thing this will do is give you a cold. So we can -- there's a tremendous of amount of -- a number of targets that we'll turn something that's lethal for one, two percent of people to not lethal to anybody.

I think we have tremendous opportunities and I can say I can list 30 different targets that we should go after.

MR. O'HANLON: And once we have these better antivirals should the government buy them for us?

MR. HASELTINE: Well, you know, it's one of the great things about the vaccines is the government buys it and gives it for free. How many other drugs is that truthful? I can't count too many nor can you.

So it turns out it's a very good thing, you know, that government buying and giving out drugs and the other, you know, all my friends are saying, oh, can I bill? I'm not quite -- you know,

qualified right now. Can you get a third shot? Should I get one?

I said, look, the pharmacist gets 50 bucks for everything he gives you. He's not going to ask you too many questions. The government pays him $50 for every shot. Of course, he's going to want to give you a shot. He'll ask you a few questions. You say, oh, I have asthma or something like that. They'll give you a shot. Go ahead. Go to Walgreens. If Walgreens says no, go to CVS.

So yeah, I hope the government does give it out for free. The answer is. Will they? Who knows? That's a matter for the Brookings Institution to look at more carefully through their policies.

MR. O'HANLON: Well, you know, it is interesting just to jump ahead to your last category of global strategy, which involves buying. You know, we've given about half as much money to COVAX so far as it needs, right?

But it's not just vaccine supply. It's also monitoring around the world and so forth. But we'll come to that. But the interesting thing if I put together some of your ideas, you could imagine writing a piece of legislation that would appropriate money to do a number of these and there might be a staggered effect like with the antivirals. Maybe the R&D happens first, the production happens later. But you could imagine sort of a five-year funding stream that you create in one piece of legislation.

MR. HASELTINE: I'm glad you're imagining that. And I'm happy to give any advice I can. I love that imagination.

MR. O'HANLON: Well, thank you. Maybe we'll come back to that. So before we go to the global part, we'll go to the public health part.

And you've already alluded to a lot of it with contact tracing. But there are a couple of pieces I know from your paper that you could probably elaborate on further like trying to make people more willing to self-isolate if and when they learn that they have it. So could you perhaps expand on the public health dimension.

MR. HASELTINE: Well, the politicization and what's happened in America and other countries with COVID is from a public health point of view just disastrous because the things that you would like to do, the things you should do, the things you know that will work, you can't do.

And it's made me think about the nature of government and leadership. And it's also behind one of my remarks I made earlier about China. You can't lead a nation to do things they don't

want to do. If people don't really want to do something, you can be the right leader but at the wrong time. Think of FDR who knew we should prepare for World War II. He knew it. And I've read in several books on the topic and I'm sure maybe you even wrote one, Mike.

But people have gone and studied what he tried to do. He tried to lead America at a time when we didn't want to go where he wanted to lead us and knew we had to go, right? It's a really good study and that is what's happening right now with COVID.

We have a government that knows where they want to go, but they can't because of individual decisions and what people are willing to do. It's really a sad thing. It's a heartbreak. And the way we dismiss that is we say, well, the Chinese are authoritarians so they can do it and we can't. Is that true for New Zealanders who did it and now they've given up? I don't think so. Is it true for the Australians? The Australians I know maybe who aren't individualistic than Americans, but maybe there's something in their background, their island characterization. There's something that's different that allowed them to do something.

But if you're in Britain or you're in the Americas and you're a leader. You just read what's MP report says. It lays it up absolutely clearly. These leaders made a judgment about the people they were leading and it led them to a slaughterhouse.

Now, whether that's murder or manslaughter is a question. These leaders knew it would lead to death and death on a huge scale, but they pursued those policies anyway. As did Trump with his Scott Atlas. I call that manslaughter in its much mild form, okay? It's knowledgeable in what you're doing and adjusting your actions despite the knowledge that people will die as a result of your action. That is what happened in this country and it's what's happening today.

Now, this government really wants to do the right thing, but it knows -- I think it knows that a lot of people, it just can't go because a lot of people are going to object so strenuously. Things will fall apart in ways they don't want it to fall apart and that is a tragedy. Can we -- and this is a question I keep coming back to.

What is it that allows people that being ultraistic enough to say, I'm going to isolate myself in a single hotel room for two weeks and even if I have to pay for it like $10 a day, I'm going to do that as long as the other guys are doing it too? Or I'm never going to do that. I die before you make me

do that and maybe you will die, okay?

So that is in the two extremes. How do we get from where we are now? Can we make it easier? Well, one might have thought about it as giving people $500 a week to isolate. Will that do it? Well, it will do it for some. Mandates we've seen work for many. I would say at this point when I look at the hospital systems. I know out of 30,000 people that there are maybe 5,000 resisters and with mandates there 500 resisters. That's kind of the numbers that my friends are telling me that they're seeing. And I think it's probably around the country.

Mandates that are moving us in the direction because people don't want to give up a job. When they actually think about giving up a job. Well, maybe I should get that vaccine. So there are ways to do it but our government -- I've written about the hole in our COVID control program.

Now, what the hole is, is identification of who is infected, contact tracing and isolation. And without that we are sunk. And our future doesn't depend on us, it depends on what the virus decides to do. If we want to put the future in our hands that's what you have to do. And hopefully, we get a pill to make it easier. So maybe paying people and give them the pill, but we've got to get over where we are now with the fundamental tools to control this.

It's not medical. It's public health. So on my list of things, it's number three. It should be number one because that's what actually -- if you look around the world what really works. Zero deaths and almost no infections, you count them in the low thousands. You know, in the last 18 months it's what China has done. And every other country was doing it would be down.

MR. O'HANLON: It does strike me though given that we spend several trillion dollars on COVID relief largely focused on the economy, but somewhat focused on, you know, the medicine and the public health requirements. I'm not persuaded that Biden wouldn't be able to get that kind of a bill through Congress. Admittedly, if he waits much longer --

MR. HASELTINE: How would he do that, Mike?

MR. O'HANLON: I mean if he waits too much longer --

MR. HASELTINE: It's precisely what we could do?

MR. O'HANLON: Yeah, I think now is in a way sort of the last -- you know, he's still in his first year. But if he waits too much longer, people are going to say, well, why didn't you do it when you

had a chance early?

MR. HASELTINE: Yeah.

MR. O'HANLON: And then it's going to be almost like a concession or an acknowledgement --

MR. HASELTINE: That's right.

MR. O'HANLON: -- for failure.

MR. HASELTINE: And, you know, I'll say one thing. I know the people that are in this administration and they're good people. They know what they should do.

And Biden, you know, I've worked with Biden for -- I don't know, 35, 40 years. He understands how better than any president we've ever had. He's been at scientific conferences I've been at going way, way back. He's really interested and he's picked wonderful people. And for the first time, we have a cabinet officer who's an excellent, outstanding scientist who's -- he also has sharp elbows, which is good for a cabinet officer to have.

I'd say a sharp elbows and a sharp mind. And he's sitting there in the Natural Security Council. He's sitting there in the President's office. He knows what we should do. And let's hope that we're able to at least take the risk to do it and not say, you know, how disappointing is it for most people to think that the vaccine is going to save them and then to be told it's not?

The same thing with the drugs. They're going to be told drugs are now a good backup. It's going to save you. And it's not the whole story. It's a piece of the story. The real story, the heart of pandemic control is public health.

MR. O'HANLON: So last the piece is public health done globally, a global strategy.

MR. O'HANLON: Right.

MR. O'HANLON: And you've already talked a little bit about this, but maybe if you could add one or two more points. And then I've been very selfish, I've been taking most of the hour with my questions. There are about a half dozen questions, I'd like to try to get to from the audience after I hear your response, your last point.

MR. HASELTINE: Well, I've already talked about the tragedy that, you know, I've created access health with the realization we had a tremendous opportunities to save lives all over the world. But

because of the organization of health and what I've learned from my years with Brookings and others is it's really a matter of public policy.

The health of a nation is public policy decisions made by a series of leaders. And therefore, my foundation works to try and many Brookings try to help leaders who want to improve. You get access to the best examples. And we're willing to work with them to help them do that. That's what we do.

But the hardest part of that whole equation is not finding things that work. It's finding people who want to make them work. I wrote a book on the Singapore healthcare system. I wrote it because it has the best outcomes in the world. It certainly is as good as any others and five percent of GDP, proof of principle. I wrote the book. Handed it to Mike Bloomberg and he said, oh, Bill that's great. What a great idea. What makes you think anybody wants to learn, okay? And that was the comment, it was not just a smartass comment, it was true because a lot of people --

You know, a read a book on NYU transition. How you take an academic medical center and go from really mediocre to the best in the world. And I've had CEOs of hospital systems say, I don't want to read that book. Yeah, I know you did. I don't want read that, okay? How arrogant and stupid is that?

Now, maybe they think I'm a promoter. I haven't been outside and I just saw what worked well. I decided like a whole series of books I've written what works best. So what you find is when you look around the world, and this is true for public health as it is for, you know, having an appendectomy or cancer treatment, it's so low on most country's development agenda that you're not even there. And before the year 2000, these weren't even there at all.

Think of your own work with the Peace Corps. Some health was there, but it wasn't the national agenda. It wasn't like infrastructure or education or industrial policy, but it turns out it maybe precedent to all of that. And it's important to get that on the agenda. And the U.N. has done a pretty good job with its millennium development goals and its sustainable development goals. They've actually put it there.

How much has that really translate? Well, when you travel around the world, it has penetrated. It's a very good step forward. Are we going to meet those sustainable development goals?

No. Did we meet the millennium goals? Some. And that's where we need to go. We need to make sure that countries aren't looking for the U.S. for a handout.

And a leader of a country's job is to protect its own people and if he can then protect other people. Now, the pandemic is a little bit different because you can say, well, those people over there are going to kill us over here. So, of course, you've got to protect yourself, protect other people. But it's a broader issue than just self-centered. It just is a broader issue. And I think you've got to create a whole environment.

And then the other thing that you see is there's so many divisions that I want to talk to about just a minute about one other topic. To me, the tragedy of our tension with China moving into the scientific realm is cutting off our hands in the future because they are our closest knowledge partner.

They are our knowledge partner. We created them. My students and my fellow students are them. They are us. And they're taking their science to new heights as we are. But to cut that off which we are doing, I can tell you all my friends say, I'm not going to send my students to the U.S. I don't know what's going to happen to them there.

These are the brightest people in the world that are trained like unbelievably well trained. Or I'm a venture capitalist, I'm not going to put my money into the America anymore because they don't want me to. I'm terrified to put my money there because they're going to come after me. These are really good mistakes. And they're especially good mistakes when it comes to pandemic control. And now, I'll get some questions in.

MR. O'HANLON: That's yeah, very good framing. China as a knowledge partner. That's not something you hear a lot in Washington, but I think it's a huge --

MR. HASELTINE: You do not and you know something? There are no such things as secrets in technology. If anybody thinks there is a secret, they should look at their own computer, okay?

You know, Stalin back in the day, knew more about the atomic bomb than Truman did. And that was the middle of nowhere in Los Alamos for Pete's sake.

MR. O'HANLON: So there are four questions. I'm going to read all four because you've already touched on most of them and I can then go back and reread whichever one you want to answer. But just so you know where folks have their curiosities and some of them came in before our

conversation.

Question one is what do you propose to do about political opposition to health strategies? Some of the problems we've been talking about. And then second question what are the right metrics to watch for in evaluating success against COVID? I guess that's beyond the obvious ones of infection rates and death rates.

A third question, how would you see long-term COVID control in high density areas like refugee camps? And then finally, is there a way to expand the whole research agenda by looking at cancers which maybe precipitated by viruses? I guess the question would be does that approach help us understand COVID better? But I can go one by one if you like or --

MR. HASELTINE: No, no. I can answer some. I can't answer the other ones.

I'm not a politician as you can tell by how I speak, okay? I don't have that natural guard that says if this phrase gets out here some -- I'd be at the bottom of the ocean a hundred times already, okay? So I can't answer the political question of how we do that.

I can only say that the deepest answer I can come up with is control of the pandemic is cultural. And there's a book that goes through that. It's instrumental. I mean it's kind of fundamental from my way of thinking. Called the *Plagues of People* printed about 40, 50 years ago by a historian who came to the conclusion that the way people survive plagues is through cultural (inaudible).

That's one of the things I've been talking about. You know, implementing the golden rule in your life and in public life. It's a very good thing to do. And that's my hope for what this teaches us. How soon it will teach us, how many bad lessons we have, how many of us have to die before that lesson sinks in, I don't know. But I do hope that's a lesson we learn.

With respect to cancer. I've talked about that in a way because the tools that we have today that we had with HIV and even more so the tools we have today are driven by a tremendous amount of research, fundamental research. So if you really want to understand the immunology of COVID. You go to the (inaudible) and almost all of them are cancer immunologists.

What is the greatest advance in the last 10 years in cancer is the application of immunology, applied immunology to which has never been cured before. I have friends who are alive and well today who would have been dead if they had what they had 10 years ago. Thanks to these. So

the answer is yes. These tools are really, really important. Developing the fundamental tools whether it be for cancer or the other great disease, Alzheimer's.

Now, curiously in several quirk of fate, it maybe that COVID is teaching us about Alzheimer's. It's a strange kind of thing. Some of the same genes that make you susceptible to Alzheimer's, late onset Alzheimer's, make you susceptible to COVID. And if that weren't enough those people with long COVID, serious mental issues with long COVID if you look at their blood, it looks like they have Alzheimer's. It is quite remarkable.

That we're now making connections that nobody ever thought possible. So when you make real research progress in one area, there are great repercussions in many other areas.

MR. O'HANLON: Sorry. There was one question about any metrics beyond the obvious ones? And maybe some of this gets into your public health monitoring and syndrome surveillance and that sort of thing.

And then the last one would be any special methods? I think this is sort of a softball for your prophylactic, you know, antiviral concept. But any specific strategies that would work in high density areas like refugee camps?

MR. HASELTINE: Well, I think that's the prophylactic one is the answer. Make sure they're vaccinated and have prophylaxis available if the vaccines are fading. I think the most practical question for everybody listening is go out and get your third shot. Five months no matter whether you're 18 or 80. You need that third shot. And it should be a Moderna or Pfizer. It shouldn't be one of the others. Not all vaccines are equal. And you really need that protection. So that is the thing I would say with that.

In terms of how to understand that things are getting better or worse? I don't think there's anything that is not obvious. I'll think about that. I can't answer that question easily off the top of my head.

MR. O'HANLON: Well, this has been, you know, a fantastic hour. And I could run off the clock with one more question if you'd like? Or we can declare a victory at least on the explanation and the education of maybe not yet on the policy front.

But I will throw in one final question because we talked about global health a bit but not in

quite as much detail. You mentioned in your paper, you haven't yet fully funded COVAC. In fact, I think you were at about the halfway point. And it's only a few billion dollars so -- and if you're having a problem with your throat maybe you can just you can give me a thumbs up.

But am I reading your paper correctly to understand that we could make substantial headway at least ensuring long-term availability of enough vaccine by adding maybe somewhere in the range of five or six more billion dollars to our COVAC requirement?

MR. HASELTINE: You know, COVAC from its onset was poorly conceived because if you actually read it, it says everybody gets vaccinated -- before anybody gets above 20 percent, everybody gets 20 percent. That's in every country in the world. That was like what planet are you on, my friend, okay?

Okay. So that was like, huh? Secondly, the answer maybe not be giving more money to COVAC. It may be giving the vaccines. Just giving them the vaccines. Now, there is something that I think is a little bit odd. You and I have traveled around the world to the most remote parts of the world, right?

But wherever I have gone, and I recognized one in 1966 when I took my first trip around the world. There was Coca Cola everywhere. I can go to a Cambodian, you know, way the hell out in back and there was a Coca Cola stand. Not Pepsi, it was coke. It was the most ubiquitous thing. It's like a citrus bar. It's everywhere, okay?

And now there are some places that that's an exaggeration. The Yanomami or you go to someplace deep in Brazil maybe you don't have a Coke machine, but it's pretty ubiquitous. There's an equivalent now which is a vaccine center for children. It's as ubiquitous as Coke.

And it's a high quality of vaccine center. There's people working there who have all the records for everybody who is born. They have high quality freezers and great vaccines. They protect all the kids from vaccines -- from childhood diseases, and it's in many places. That's an infrastructure that's been built with countries and internationally. That is the example that I would like to see for adult vaccines and adult drugs.

You know, you see it narrowly. If you ever go to Africa and you look at PEPFAR that's what you see too. PEPFAR is in an isolated hut. It takes you 12 hours to get to, the last hour by

motorcycle. PEPFAR reaches there in Africa. It can be done. But it has to be done together. What allows PEPFAR to do it for HIV and not for malaria or for some other disease is on our money.

So yeah, their infrastructure but our money. So there are ways of doing that. And I'd like to see that as a global program. The same thing we do with childhood vaccines do for adult vaccines and some selected adult drugs. Build that very, very expensive network. And that takes the cooperation between the local government and international resources. And those resources we've got. And so that's what I mean.

Now, you being the Peace Corps out there and watching what can be done. You know that can get done. It's not -- you know, so when people tell me, oh, well, Bill. Yeah, you can give them the vaccines they don't know what to do with it. I say, wait a minute. We give them all they get. These childhood vaccines, they know exactly what to do with it. What are you talking about? Oh, well, you can't translate that for adults like you can for children. It's a different way of thinking. Well, how different, I ask?

MR. O'HANLON: Really good. Listen, thank you so very much. Your assessment of the situation, your four category strategy and your explanations for the elements are just so helpful. And I hope that a lot of folks are listening. I hope the Biden administration which is doing an okay job can take its game up a notch or two to an even higher level as you've advocate.

And I want to think everybody for tuning in today. This will be on the website forever. Living there forever and I hope it gets a lot of attention because Dr. Haseltine, you're a real hero and a great educator as well as a great scientist. So thank you very much.

MR. HASELTINE: You're very kind to say that. Thank you.

MR. O'HANLON: Signing off for Brookings. Have a great weekend everyone.

MR. HASELTINE: Take care.

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