RUTGERS, THE STATE UNIVERSITY OF NEW JERSEY

NEW BRUNSWICK

AN INTERVIEW WITH BRIAN STROM

FOR THE

RUTGERS ORAL HISTORY ARCHIVES

INTERVIEW CONDUCTED BY

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TRANSCRIPT BY

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Shaun Illingworth: This begins an oral history interview with Dr. Brian Strom. I am Shaun Illingworth. I am in Hightstown, New Jersey today. Dr. Strom, can you tell us where you are today?

Brian Strom: I am in Penn Valley, Pennsylvania.

SI: We are also joined by Dr. Paul Clemens.

Paul Clemens: I am in Metuchen, New Jersey.

SI: Great. Also with us today is Taleen.

Taleen Jamgotchian: My name is Taleen Jamgotchian, and I am in Belleville, New Jersey right now.

SI: To begin, Dr. Strom, can you tell us where and when you were born?

BS: I was born in New York City. I was born in the Bronx but moved to Queens one year afterwards--not my doing. I was born in 1949.

SI: Now, we want to focus on the impact of the COVID-19 pandemic first. One question we have been asking folks around the university is when did that really start for you in your awareness? What was the first time you would say you heard about this growing crisis overseas? How did that come on your radar screen?

BS: It came on my radar screen via news reports and other reports, like for other people, but it was in early January of 2020. That's the same as everybody else. The difference is that it was apparent to me from then that it was going to be a problem. In fact, in January of 2020, I was estimating 500,000 U.S. deaths over the next year. People thought I was out of my mind. It turns out that estimate was a little bit of an underestimate. I'm an epidemiologist, and I've been involved nationally and internationally in preparedness efforts in the process. Although I'm not an infectious disease epidemiologist, this was very comfortable material for me, and it was clear this one was scary. This one was different.

SI: When did you start getting pulled into conversations around the University about how this might impact things? Was it already impacting the University by the time that unfolded?

BS: I actually drove those discussions in January 2020. I have two roles; one is Chancellor [of Rutgers Biomedical and Health Sciences/RBHS], the other is Executive Vice President for Health Affairs. As Executive Vice President, I'm responsible for everything health-wise in the University, so overseeing activities not just within RBHS but any patient-facing or health-related issues. In my role as Executive Vice President, I sort of blew the whistle on this in January, saying, "This is going to be a problem." We started having regular meetings and regular planning for it and basically led that process, until it was clear that it was imminent in New Jersey and in late February President [Robert] Barchi triggered the Emergency Operations Center [EOC] at the University. With that, Tony Calcado took over leading the effort going forward,

obviously with our major input along the way. I wasn't reactive. I was driving it, in the beginning. Tony drove it from then on.

SI: What do you remember about those early meetings, before the switch was made to the emergency footing? What stands out about how people reacted? What were the major goals of those meetings?

BS: Planning, skepticism, education. I want to clarify what I mean by that. It was obvious to me where it was heading. Other people were skeptical about it, but we needed to educate people about what was coming and plan for the University to be able to handle what was coming, that this wasn't something that was going to just be based in China and go away at that point. It was way beyond that already in early January, even though the initial reports were all from China. The exact pathway of going through Europe we could not have predicted, and ultimately the strain that we were primarily infected with was actually an Italian strain rather than a Chinese strain, the virus having come to the U.S. through Europe as it did. We sent out a series of--I don't remember if it was weekly, it may have well been--communications to the University community to begin to prepare the University community for what was coming.

SI: Taleen, go ahead with a question.

TJ: After hearing about this imminent threat to the campus, as you said before, what were the University's biggest priorities in order to respond to the COVID virus?

BS: I think the primary priority early on was education. I don't mean education in terms of student education, but education of the community about what was about to happen. The world had not been through a pandemic like that in a hundred years. There were epidemics: e.g., Ebola, the SARS [severe acute respiratory syndrome] scare. I mean, there were smaller epidemics like that, but this was clearly going to be something different than any of those. Getting people used to the fact that this was the case was a primary focus of our initial efforts. We had the advantage and disadvantage of the federal government's response being so incompetent and so confused. People were looking elsewhere for expertise instead, so people were more willing to listen in response. Actually, as a rule of thumb, we were two steps ahead of the State Health Department. The State Health Department awaited the recommendations of the CDC [Centers for Disease Control and Prevention] to respond. The CDC already lagged one step behind at that point. So, we were walking a tightrope of not wanting to be so far ahead of the public health regulatory bodies that we might be reined in, so to speak, but knowing what was coming, we literally very explicitly, very verbally talked about staying two steps ahead of the State Health Department, not waiting for the State Health Department to respond to it. That changed later, of course, as the State Health Department rose to the occasion.

SI: As part of that, were there any direct meetings with the state at that stage before February?

BS: Not that I'm recalling. Certainly, once Tony was leading it, there were more meetings with the state in terms of the Education Department. I was interfacing some with the State Health Department, but I can't remember the exact timing of when the switch switched and the state started to take it seriously, but it was somewhere in that transition. By the time the EOC was

triggered, clearly everyone knew the onslaught was coming because we had the European experience to see at that point. But we had to educate people and prepare for it. Part of the message was, if it was happening in Italy, we're going to be there in two weeks; we've got two weeks to prepare. It was clear already the timing of how it was progressing. Unfortunately, the U.S., as a nation, wasn't prepared despite that. Again, I think the state has done a good job of this along the way. But early on, they were not prepared either, and it probably took closer to the summer before they caught up.

The other issue is, once the state began to see the onslaught coming, their focus was appropriately on preparing to be overwhelmed from a clinical point of view because we became the epicenter of this disease in the world. We watched Italy get overwhelmed, people having to be taken off ventilators and allowed to die. We watched New York be overwhelmed, and again, people making choices--who do you give the ventilator to or who do you allow to die? The healthcare system wasn't prepared for this kind of surge. The state earlier on--this was now more February/March--was preparing for the healthcare surge to come. That was its focus, appropriately.

I am proud to say--and I think this is true, I've said it in other places and no one has come up with anecdotes to disagree--that no one in New Jersey died due to lack of a hospital bed. Nobody in New Jersey died due to a lack of a ventilator. Nobody in New Jersey died due to a lack of an ICU [intensive care unit] bed. Nobody in New Jersey had to have two people on one ventilator, which New York was doing in order to handle things. We handled the surge, but it was literally every day, nip and tuck. We had too few ventilators ready for this, such that one of my leader's brothers who is on the Tesla board--Tesla manufactured ventilators for us--and when those ventilators couldn't be hooked up because there was a missing piece to our hospital connection, we used the Rutgers engineering department's computer printer manufacturing facility to make those missing pieces, so we could hook the ventilators up accordingly.

It was literally touch-and-go every day during that first spring. We started meeting probably in February, maybe March. The EOC was meeting every day, and the RBHS leadership was meeting every night in order to be able to handle the crisis, e.g., to handle PPE [personal protective equipment]. We were manufacturing our own PPE because we couldn't possibly get enough PPE to be able to handle the demand, and then our hospitals were sterilizing what should have been one-time-use equipment.

People don't have a sense of how enormous this surge was. Ultimately, federal financial relief was offered to hospitals which cumulatively ever saw more than a hundred cases. Our hospital never went below a hundred cases each day for week upon week upon week. We had 250 cases in the hospital at one point in time, not a hundred cumulatively. Deaths were so common that more people died in New Jersey during COVID within three months than in most of the state's wars in history put together. There were so many deaths that we at Rutgers were asked for parking lot space for body bags because there wasn't enough space to hold all the bodies. The stress level and the demands placed and the planning needed to be able to handle all that on the clinical side was enormous, while simultaneously trying to assist on the public health side as New Jersey, like most states in the country, had basically dismantled much of its public health infrastructure.

When it comes to treating a cancer, having a brain tumor taken out, people are happy to spend a fortune, but it's hard to raise money based on a case of disease that didn't happen. Prevention doesn't get invested in. When money gets tight, it's an easy place [to cut]. When we went into this pandemic, based on very conservative estimates, the number of contact tracers needed to trace down the people that were positive, just in New Jersey alone, exceeded 2,000 contact tracers for a pandemic much smaller than this. Yet, the entire country had only 2,000. All of that had to be created in response to the pandemic. Ultimately, we trained in our School of Public Health over 2,000 for New Jersey and kept a number of them for Rutgers, specifically. We at Rutgers have been much healthier than the rest of the state, and that's one of a few reasons. But people just don't have a sense of how enormously underprepared the country was--it had been [prepared] a decade before--but all that was dismantled and now all of that had to be rebuilt while this clinical crisis was underway.

SI: Another aspect that gets overlooked by the public response is the impact on the healthcare workers and the system. How did you deal with that in terms of both people getting sick and then also having to deal with the stress, as you discussed, of this twenty-four-hour grind?

BS: It was an enormous issue, and it has changed over the course of the year. I want to clarify what I mean by that. If you look at the literature on stress and people dealing with stress and emergencies, it has gone through exactly that cycle. Early on, it was all-hands-on-deck to handle the emergency. The EOC was meeting every day. Our leadership at RBHS was meeting every night, as I alluded to, and basically, everybody mobilizing to do it. As more cases came in, hospitals would close one ward at a time to be a COVID ward. They were mobilizing the staff to handle that COVID ward. We didn't know if PPEs would even work. [It was a] huge stress on staff in terms of what it'd mean to them, what it'd mean to their families. When we shut down the University from a classroom and dorm point of view, we made those dorms available to healthcare workers, so they could stay in them and not go home, to protect their family, because who knew how many of them were going to get sick and pass it onto their family and how many of them were going to die from this and pass it on to their family. Again, we didn't know how well PPEs were going to work, and we had these enormous shortages of PPE along the way.

We simultaneously mounted a number of studies, including the largest healthcare worker study then underway, and it turns out that the way we were using PPEs lowered risk for healthcare workers to the same level as risk in the community. They were working very well when we could access them, but we had to set up sterilizing procedures and so on because we couldn't buy enough PPE. So, we had to reuse them accordingly. But early on, a lot of people dropped out of the workforce because they were sick. New Jersey mobilized assistance from all over the world, giving immediate licensure to people who had retired, giving immediate licensure to people who were licensed in the other states, giving immediate licensure to people even from other countries temporarily. We graduated our clinical students earlier, so they could join the workforce in order to deal with that enormous spring surge.

As that calmed down over the summer, all of a sudden, it was sort of a breath of fresh air and relief, and people began to think about what they went through and the mental health implications. We did lose staff to the disease, but not enormous numbers because the PPEs work

in terms of losing to death at that point. The mental health stress was such that a whole bunch of people then retired over the summer. They weren't going to go through it again. Fortunately, New Jersey didn't have a surge in the summer, but the rest of the country did. As we went into a surge in the winter, all of that PTSD [post-traumatic stress disorder] came back in terms of, "Oh, no, we have to do it again?" The rate-limiting step in the winter was no longer PPEs and supplies, because we had prepared for that. The rate-limiting step was manpower, because we had lost a lot of manpower to retirement and sickness and women taking care of kids in school. People who were nearing retirement age just retired. People who were younger and had kids and they were watching them in school said, "I'm not going back into the hospital to take care of them. I'm taking care of my kids instead." Manpower presented an enormous shortage and now couldn't be pulled from other states because they were having a surge at the same time.

In the spring of 2020, it was a New Jersey-New York phenomenon. In the fall-winter of 2020, it was a nationwide phenomenon. So, the rate-limiting step in the winter was manpower. We never had a shortage of ICU beds. We never had a shortage of hospital beds or ventilators. We had a shortage of the people to be able to man them, and people, being asked to basically work day and night accordingly, at the time, from a mental health-stress point of view, said, "I'm done. But now it came back again." That's still underway. Now, as we speak on March 26th, 2021, beginning what will be the third surge for New Jersey, and the fourth surge for the country, the PTSD of having gone through that is very real and very enormous, and we will be dealing with that in healthcare for decades to come in terms of the damage done to healthcare workers.

SI: You mentioned how much of a challenge it was to educate the public early on because it had been largely unprecedented since the 1918-1919 influenza pandemic. That also changes over the course of the pandemic. You get a lot of crazy ideas in the public's mind, and the mission of public education continues and evolves. Can you talk more about that and how that changed?

BS: Yes, absolutely. It changed and was made much worse by the noise coming out of Washington, much of which was wrong. A significant part of the public, particularly in New Jersey, eventually recognized that and turned to us instead. There were a whole bunch of us who were out there talking to the public and still are. Now, obviously, the focus is vaccination, where before it was issues of testing and understanding the disease. Public health measures are an issue still in both time periods, earlier and now. There's a lot of us out there, trying to educate the public and be the talking heads to try to do that. I give, every two weeks, a web-based COVID-19 health briefing. The alternate weeks, Mary O'Dowd leads a podcast ["On the Pandemic"]. Denise Rodgers is out in the Newark community, in terms of local community centers, probably two or three times a week, giving talks at churches and other sites. Bob Johnson, who's dean of the two medical schools, is doing the same, spending time, not as much as Denise is, in the community, trying to educate the public. I've done a number of podcasts on Newark local FaceTime podcast stations, basically trying to educate. I'm talking to the press a lot, trying to educate people about what's happening, what's real, what's not real, what are real treatments, what are not real treatments. There's so much misinformation out there. It is striking. The public needs the truth about vaccinations currently, and the safety of the vaccine, who should get it, who shouldn't get it.

Even among medical faculty, it's amazing the lack of awareness. Can Rutgers give vaccines itself? Will it be prepared to give vaccines? What's going to happen? As of yesterday, people now know we're requiring vaccinations for students to come back in the fall. We're probably the first university to make that requirement. I think we'll see huge numbers of universities, at least on the coasts, follow us. They were waiting for somebody to take the lead. Rutgers has gotten an unbelievable press response to it. We never anticipated how much attention it would bring, but we want to have a safe campus and the way to have a safe campus is to vaccinate people. We may not be allowed to require vaccinations of staff. We can require vaccination of students. We want to be able to bring back the normal student experience, living on campus, being on campus, and interacting among students in a normal way.

An enormous amount of public education is still underway. I was on a call just before this--what about international students? What if they get vaccinated with a Chinese vaccine or a Russian vaccine? It's a sort of continual process of policy-making, which changes daily as more science comes in. Early in the pandemic, the message was, "Don't use masks," because we needed to save the masks for healthcare workers, and in most respiratory illnesses, the disease is passed by people who are already clinically sick. What we found to our surprise, in fact, is that most of the disease is passed by people who are not symptomatic or not yet symptomatic, and so we need masks in order to prevent the spread. Early on, people would wash hands, wash surfaces. There are still people washing their groceries when they come into the house. There are almost no cases of disease passed by fomites, by surfaces. It's passed in the air. All this is new science because this is a new disease. This changes daily. We need to educate the public about it. We need to educate the University about it. We want to educate people about the state of the art. We don't want to give false reassurances; we don't want to give false information. So, it's that balance of what's accurate, what's not, in a time of very, very rapidly changing information.

Whoever dreamed we'd be in the wonderful situation a year later of having three phenomenally effective vaccines? These vaccines would have been approved if they were fifty percent effective, and they're ninety-five percent effective. Of the hundred thousand people in the vaccine studies who received the actual vaccine, the number of people who got the vaccine and then died from COVID is zero. The number of people in the hospital is zero, of the people who got the vaccine. They're phenomenally effective. Now, we have a major education effort out there to say, "Get the vaccine, and don't wait. When you're eligible, get it as soon as you can get it. This is lifesaving going forward." Education of the public and of our community has been a massive amount of work and effort.

The other thing that's made this much harder is, normally when you mount a vaccination campaign, you turn to the public health community to do it, but public health had been gutted, as I alluded to before. In fact, [President Joseph] Biden, in the bill that he just passed, has money for a hundred thousand new public health workers to begin to address it. Hopefully, a year or two from now, that won't get undone, as has been done in the past. So, there wasn't enough of a public health community to be able to run the vaccination campaign, but we turned to the clinical community and the clinical community was drowning already in taking care of all the cases. Again, bad preparation in Washington. Why in the world does every state have its own processes? Why, when you go from Pennsylvania, where I am now, to New Jersey, which is doing a much better job than Pennsylvania is, are the processes different? What's a 1-A for

vaccination access? What's a 1-B? It's different in every state. I mean, it's crazy. Even in New Jersey, when you register online that you want a vaccine, it doesn't connect you with the sites that give the vaccine. They each have their different registration systems, some of which tie to the state system--the Rutgers one does--but many of which do not tie to the state system. All of that should have been done in advance. There was plenty of time for it. It all could have been done by the CDC and pushed out so all the states had it available, and it just was completely mismanaged. We're left picking up the pieces.

SI: Well, we've been talking about the subject of medical research and how it's affected this crisis. Rutgers has been involved, from developing tests through the vaccine. How does that part of your job evolve and grow as this is going on?

BS: Yes. Clearly, as an academic health center, we have three core missions. Like other academic centers, our job is to generate and then transmit new knowledge. One core mission obviously is education, of course, training different types of health professionals in our different schools. One is clinical care, and we've talked a lot about the clinical care. The other is research. When you come to a situation like this, it has to be done incredibly quickly, incredibly fast, because millions of people are getting this disease, hundreds of thousands in the U.S., millions in the world dying from this disease. Every day of delay in the research means more people will get sick and people will die because of that delay. The solution to the disease clearly is medical research. The only solution to the disease is medical research. From the very beginning, on one hand, that was clear, our mission and need. Fortunately, NIH [National Institutes of Health] had money to support it, but it wasn't as fast as it could be in providing the funds, in typical federal fashion.

There are things, like our healthcare worker study, that we launched on day one with the first healthcare workers getting tested, before we could get any money from anywhere else and before we could get money from NIH. We ultimately got money from NIH to fund it, in retrospect and on an ongoing basis. But we funded that initially ourselves, took the risk of funding it ourselves, because we needed the baseline data and you needed to know answers right away. We needed to know--were our healthcare workers going to be protected by our PPE, i.e., was the PPE working? The answer is yes. Were the people who were in contact with patients at much higher risk than the people who weren't? The answer is yes. Were the physicians different in risk versus the nurses? The answer is yes. Was University Hospital in Newark as a safety net hospital different from Robert Wood Johnson University Hospital in New Brunswick? The answer is yes. We had to understand the impact of all these on healthcare workers.

We launched the largest healthcare worker study then done, and we funded it. The University responded enormously quickly, and IRB approval--Institutional Review Board for Ethics--typically takes weeks, often months. We got all of that approved, all the contract stuff done, everything done within forty-eight hours. I mean, the University just responded in a way that was magnificent to all of us, and we launched this study and multiple other studies incredibly quickly. We set up a Center for COVID-19 Response and Pandemic Preparedness, to prepare for future pandemic responses, too. This isn't a center that will go away when COVID is gone. Again, we put up institutional money to fund the pilot work there, and then the faculty would

apply to NIH for other money. We also went to donors to be able to collect money to be able to fund such efforts. There was an enormous research effort mounted across the University.

Now some of our research, a substantial amount of research, had to be shut down because researchers weren't allowed to come into work from a contagion point of view. With that, we mobilized all of the PPEs the researchers had had and gave it to our clinical side. We also mobilized their computerized manufacturing, computer printing, 3-D printing capacity, as I alluded to before, in order to be able to mobilize it for the clinical side. But at the same time, COVID research became the highest priority, both laboratory development of new tests, development of new treatments, and eventually development of vaccines. We have lots and lots and lots of COVID studies underway, some funded by industry, most funded ultimately by NIH, and some that we had to fund internally, at least before the NIH funding kicked in, in order to mobilize our research community.

Fortunately, one of our big strengths in RBHS, out of our strategic plan, is Infection and Inflammation, so we had the community ready to do this. We also had the clinical trial community. Jeff Carson [Provost, New Brunswick at Rutgers Biomedical and Health Sciences] led the Rutgers part of a clinical trial, which achieved the second biggest subject enrollment in the world to study the J&J [Johnson & Johnson] vaccine, the third biggest being Colombia, not Columbia University, but the country of Colombia. We had principal investigators ready to go with enormous expertise. Our goal was to get regulatory barriers out of the way, get financial barriers out of the way, and mobilize things for them as much as possible, so they could get moving and make contributions. We're very, very proud of the contributions that we've been able to make.

Obviously, the Rutgers saliva test is well known. Less well known, perhaps, is that we actually developed the first rapid test for COVID, not using saliva but using nasopharyngeal smears. We also just announced last week that the same group, led by the person who leads the COVID center, David Alland of the New Jersey Medical School, developed an ability to test for the strains that are of concern, as we now look at variants emerging. Rather than patent it, he put it all out as publicly available, so anyone in the world could use that same technology and test for these strains in general. Again, we didn't wait. We've been ahead of the State Health Department all along; we still are. We are testing all of our positives for variants. The state is not. We're using the same testing research capacity that was at RUCDR [Infinite Biologics], which developed the saliva test, to test every positive at Rutgers for variants right now. Again, we're ahead of the state, ahead of the country. The country is way behind in terms of testing for variants. We've looked to advance our research but also use our research capacity to be able to help the clinical community and help public health initiatives accordingly, across our three missions. Again, this is the kind of thing you can do at an academic health center that you can't do elsewhere.

SI: I just want to clarify what you just talked about, retesting the positives for the variant. Does that mean if I had been given a test, tested positive, you could sometime in the future retest my sample?

BS: In theory, it could be. It doesn't make sense to do that in the distant future. What we are doing is to the degree you're positive this week, your test will automatically be sent looking for strains. Tests from months ago aren't going to be any of the new strains because the new variants weren't around. Now, probably about ten percent of our positives are variants and rapidly increasing. Most of them are UK variant and New York variant, and especially the UK variant is more contagious. We've had, at this point, only one known case of the South African variant, which is somebody who got fully vaccinated, a student in Newark in RBHS, a fully-vaccinated student, who weeks later, on routine weekly testing, tested positive despite the vaccination and then ultimately got symptomatic, mild symptoms that quickly resolved. That was the South African variant, which is the one which we know has some resistance to the vaccine. Of the variants we know about--and there are undoubtedly dozens and dozens we don't know about--but of the ones we know about, the South African one is the next most scary. The scariest is the Brazilian one because that may be fully vaccine-resistant, and we have not yet had at Rutgers any cases of the Brazilian variant.

SI: I have been monopolizing the questioning. Taleen, do you have other questions, or Paul? No, okay. Well, I will keep going then.

BS: Paul, you're on mute.

PC: Shaun, I do not want to take this off in another direction, so if you have got a flow, maybe you should keep going, but I do have a question. I can get back to it later.

SI: Okay. Looking back at this past year, what for you was your most vivid moment, or what stands out in your memory the most about this crisis?

BS: I guess the most vivid moment was early on when it was clear what we were heading into and people didn't realize. What stands out the most is the wonderful resilience of the community. RBHS is a very, very different place than it was seven years ago when it started. I've replaced eighty percent of my deans, all my institute directors, eighty percent of the department chairs. We've been recruiting two hundred to 250 new faculty a year, which is a net growth of twenty-five positions each year as we turn over. It is a very different place than it was seven years ago. It gives me terrific pride to see how we have responded. In fact, we put signs up on the Jersey Turnpike as thank-yous to people for the resilience of the community, people's willingness to rise to this amazing stress. We have more than a thousand clinicians who contributed to it. What people went through was hell. For people to be willing to do that and go through what they went through at this time of enormous stress, whether you're talking about the clinicians, whether you're talking about the researchers, whichever group you were in, everybody banded together and really worked together to handle this crisis. Again, we were talking about the stress earlier in the interview. People did it enormously effectively, putting aside what they were feeling to look out for what was important to the public and to the University instead of them personally. The resilience in the process was just phenomenal.

SI: We have talked about how public education programs include podcasts, webinars and a lot of media appearances. In general, how would you rate the effectiveness of this campaign? Is it achieving its goals?

BS: Certainly partially and only partially. In some ways, you guys can probably answer that question better than I can, but the sense I get is there are certainly people who are listening; there are people who are paying attention. There are others who ask surprisingly naïve questions. I'm glad they're asking them so that we can answer them, but it shows we didn't get through before. I think the demand for people wanting to be vaccinated is wonderful and shows a lot of education, but there's also backlash. We announced yesterday at the University that students will need to be vaccinated, and the overwhelming response, almost all are positive, but there are anti-vaxxers out there who refuse to take vaccines of any kind and see this as big brother coming in. It is big brother coming in, in many ways, because we're coming in to protect the University. Our goal is to have the healthiest University in the country.

We've succeeded in doing that so far. New Jersey, since the spring, and in part because of the bad experience in the spring, is in better shape than much of the rest of the country, and Rutgers is in much better shape than the rest of New Jersey. For example, our positivity rate at the University--WHO [World Health Organization] gets worried if you go above five percent, that of the tests done, more than five percent are positive because it's an indication that the pandemic is expanding and many positives are getting missed. The state was above ten percent for week upon week upon week. We were averaging one-tenth of that of the state. We are now below one percent at Rutgers. This is all on the web, again, public information, as are the variants, by the way, as of yesterday, for the first time. We're just doing dramatically better as a University than the rest of the state, which is doing better than the rest of the country, and our goal is to continue that. We want the students to be able to have as close to a normal experience as they would have had but to be able to do that safely for the students and for the employees. The President has been wonderful in supporting those initiatives as part of that.

SI: Taleen, you had a question, and then Paul.

TJ: Yes. In response to the email sent out yesterday to everybody across Rutgers' campuses about requiring the vaccination for incoming students in the fall on campus who are attending classes, what other types of protocols will be followed when a majority or a significant amount of students return to campus? How do you plan to enforce these protocols?

BS: The enforcement is going to be hard because we don't have in our buildings a way to enforce swiping on the way in and so on. That remains to be seen how we're going to be able to enforce it. It's already come up in terms of international students from overseas who are sitting and going, "Can I come to Rutgers? Will I be allowed to come to Rutgers in the fall?" What we've made clear is, A, if you've gotten any U.S.-approved vaccine, either the three now approved or any that in the future will get approved--AstraZeneca presumably will be approved between now and the fall and that's widely used in other countries--it'll be recognized at Rutgers. If you have not been vaccinated or you have not been vaccinated by an FDA-authorized vaccine, we will be prepared to vaccinate you. We are already approved by the state to give vaccines. They just haven't given us any vaccine supply yet. We hope, within a couple of weeks, that will change as the vaccine supply continues to broaden. So, we'll be in a position to vaccinate anybody who's willing to be vaccinated and who hasn't gotten it elsewhere, and that's true for

students as well. That's part of the reason we targeted this in the fall, not the summer, because we couldn't guarantee that for the summer. We can for the fall, given the supply of vaccines.

PC: I had a question that went back to Shaun's initial question about the media. I just wanted to hear you talk about it a little bit. It's also come up for me in thinking about Dr. [Anthony] Fauci [Director of the National Institute of Allergy and Infectious Diseases] and the way he addresses the larger public with education. When you talk to the public in your role, or to the lesser public of Rutgers perhaps, but mostly the larger public of New Jersey, one of the things I have noticed is that, unlike politicians, like our governor, for example, you're always--I think positive is the way to put it. You talk to people about what they ought to do in order to protect themselves and protect others. You don't push back directly on the people who are just lunatics. [laughter] That is, you don't spend a lot of time countering the publicity that gets in the newspapers a lot about people who are proud that they don't wear masks--not just the anti-vaxxers, who, in a sense, they're not quite the same sort of problem because they had these feelings before this crisis occurred with a general anti-vaccination position--but the people who now buy into some sort of either conspiracy theory or, more likely, simply think that all the information they're getting is false. I don't hear a lot of pushback, and I wondered if that is a conscious strategy in order to avoid controversy. Is it something you have thought about, how you ought to target what you are saying, or is that just a reflection of your professional goal of giving people accurate information?

BS: Yes, I think the quick answer, it's the latter, but let me flesh out what I mean by that. So, Tony [Fauci] is somebody who I certainly know. I actually just, on video, gave him an award, which will be public in the next week or two. I've known him before as well. He's fantastic and a fantastic communicator. Even early in this process, when he was the only voice of reason out there and people were asking me, "Can I believe what Tony says?" my answer was, "Everything he says absolutely you can believe, but pay attention also to what he doesn't say because he's in a situation where he's constrained, restricted in things that he can say. If you avoid saying something, that's also a message." He is a master at doing that and never saying anything that isn't true but trying to duck political landmines. Now, obviously, with the new administration, he has more freedom to just be open and honest.

I think in terms of my own statements, it's an interesting observation you made that I hadn't noticed before. It's certainly not conscious. I've certainly had many private discussions arguing with people who are irrational or anti-vaxxers, anti-maskers, and whatever. In general, they don't listen to reason. People who don't believe in science, don't believe in science. In fact, I've reached out to the Education School to talk about that we've obviously bred a generation of people, a subset of whom don't believe in science. It's understandable because we do a lousy job of teaching science in K-to-12 education because scientists don't want to be K-to-12 teachers. If you're a real scientist, you want to be a college professor or some other role, rather than a K-to-12 teacher. The K-to-12 education in science tends to be cookbook. I always, with my own kids, would be frustrated listening to what they were learning incorrectly or badly or off target in their education and would try to correct things. Most K-to-12 education in science is not discovery; the science is cookbook and that's wrong. That's how you end up in a situation where Tony gets criticized for a change in the mask recommendation, when the point is the facts changed, and people don't understand that's the way science works. I've actually reached out to

the Education School about other ways we at RBHS can help them in their education to educate teachers better in future generations.

I've targeted my comments to people who want to listen, they've tuned in for a reason, and wanting to give them the most accurate and complete information. If they're not going to listen to facts, they're not going to listen to facts, but they're also probably not going to tune in. The fortunate thing is that in New Jersey, it's not that they don't exist, but they're a smaller portion of the population, in part because Jersey K-to-12 education is better and in part just given the community and the public of the state. But I'm also used to talking to scientists and people who believe in science. That's what I naturally deal with.

It's also hard to communicate sometimes the lack of that knowledge, the uncertainty. Often, we just don't know, yet at least. Again, in the meeting I had just before this, when we were talking about people overseas, someone was asking about the student vaccine mandate. If people are overseas and if they got a Chinese vaccine or a Russian vaccine, will we accept it? The answer is no, but we will vaccinate them with an American-approved vaccine when they come. Is there a risk of doing that to them, getting vaccinated and re-vaccinated? There's good reason to think that it should be okay, but we don't have data to prove that because there aren't yet publicly available data to know whether those vaccines are safe and effective by themselves, no less than if you then give an American vaccine on top of that. But we know we can't rely on those vaccines being safe and effective. If they ever develop the data to get there, they'll have FDA [Food and Drug Administration] approval, and we will accept it. Our threshold is FDA approval and CDC approval, not the fact that some foreign government wants to compete with U.S. manufacturers and put out products prematurely. Anyway, the long-winded answer to your question of whether I do that deliberately is, no, I don't, [laughter] but it's an interesting observation.

SI: Taleen, you had a follow up.

TJ: Yes. Going back to what you said about requiring a vaccination should international students want to come back to campus and it is not cleared by the FDA, this is a two-part question. The first part is would you possibly be requiring the Johnson & Johnson vaccination because that is one dose and it can easily be distributed since we have the Johnson & Johnson building on campus?

BS: Let me answer that in a few ways. One, is we will accept any vaccine that is U.S. accepted. We don't care which one. Second, is we don't actually have more J&J vaccine than anyone else. Right now, at Rutgers, we have no vaccines to be able to administer. But you're right, J&J has the advantage of the one-dose vaccine, and as more of a vaccine supply becomes available, if we had a choice, in that situation, I would recommend the Johnson & Johnson vaccination in exactly the situations you're describing. Right now, my advice to people is that the best vaccine is the one you can get, quoting Jeff Carson in the process. But in terms of which one will be offered to international students, hopefully, we'll have the J&J vaccine to be able to give, and I'm optimistic that that will be the case. Now, once we first get vaccines to give to the University, hopefully in the next couple of weeks, it probably won't be J&J. We don't know that because the state hasn't given us any vaccines yet. It probably won't be J&J. It'll probably be the mRNA vaccine

because we have the capacity to handle them, given the cold-chain issues. The J&J vaccine, which doesn't require very cold freezing and doesn't require coming back a second time, is really being disproportionately reserved for the populations that have been suffering lack of access to the vaccine. [Editor's Note: The Pfizer-BioNTech and Moderna vaccines are mRNA vaccines.]

For example, in the state as a whole, fifteen percent of the state is vaccinated, but only five percent in Newark. So, we're helping the city of Newark to mobilize a mega-site; our students will help staff it. It will give J&J vaccines, so you don't have to worry about people coming back a second time. In Camden, there are pop-up vaccine sites in poorer communities, the same way. You can do that with J&J. You can't do that with the other two vaccines. In terms of what we'll give at Rutgers for our own employees at our own pods [points of distribution], as we get them, I would expect what we will get from the state is the mRNA vaccines because we can handle it. But by the time the international students are coming over, it'll be a different situation because there'll be a surplus of vaccines at that point rather than a shortage.

TJ: Thank you. For my second part of this question--I have spoken with students currently attending other universities, such as Boston University, Clemson, Purdue, Ramapo, and even Ohio State. Each of these schools has similar protocols to protect their resident students from contracting and spreading the virus as well. Some of these protocols include wearing a mask in public spaces, social distancing, online reports if you've contracted the virus or feel any symptoms, mandatory testing varying from every three days to once a week, take out for dining halls, and plenty more. My question for you is how has Rutgers' response been unique? How has their planning been unique during the pandemic for the return to in-person instruction compared to other universities? In specific, what challenges has the administration encountered through these last few months with regards to preparation? What are some remaining unresolved issues and conflicts still left in regards to returning to in-person learning?

BS: Yes. All of what you described, we have in place, and the frequency of testing has varied over time. As we started getting a lot more cases in the dorms, we increased the frequency of testing in the dorms, for example. Basically, everything you've described we're doing. We also have much more aggressive contact tracing than most other universities, and that has been key to keeping the positivity rate as low as I was describing. We've also had most of our classes overwhelmingly remote for undergrads in particular. On my side, at RBHS, it's different; for clinical training, you need to be in a clinical setting. Beyond that, it's mostly been remote. With all of those interventions, Rutgers has been in much better shape than most of the universities in the country and certainly most universities in New Jersey. New Jersey itself has been in better shape, as I alluded to, much worse in the spring and then better since.

I think in the fall, we're talking about a series of new, different initiatives. One is obviously the vaccine [requirement] that we announced yesterday. Beyond that, classes are largely going to shift, still with masks and distancing. Large lectures will remain remote. Medium-sized classes will be done in the large lecture rooms. Small classes will be done in the medium-sized rooms, with additional cleaning and sterilization and so on. The student requirements we talked about, we haven't begun to grapple with what we can do with faculty and staff. That's much harder to deal with. We might well never be able to require it of faculty and staff. What we might be able to require is you either get vaccinated, or you get tested that day.

I think what we will see as a country, and actually, I just said this to a reporter last week, it will be in the press next week, my prediction of what the country is going to look like in the fall is that we'll even be able to return to restaurants and theaters and shows and so on with people having vaccine passports. The people who've been vaccinated get in. The people who aren't vaccinated either don't get in or have to prove they got tested that day with a test that is more accurate and reliable than we can do now. The accurate tests we can do now aren't that fast. The fast tests that we can do now aren't that accurate. But the technology is changing fast enough that my hope is that by the fall, we'll have that hybrid, that you're either vaccinated or you get tested, potentially, literally, on your way into the restaurant or on your way into the theater, or you test at home, you come with a printout that showed you did the test and were negative that day. To me, that's the way out of this.

To be clear, the pandemic will never disappear. It will become endemic. We will learn to live with this virus, and we are learning it. With the rapid advancing of vaccines, it might even happen this calendar year, but we're going to be wearing masks for a while.

SI: This crisis has also exacerbated long-existing problems in American society, such as anti-Asian prejudice, which has been in the news the past few weeks but throughout really, and the relationship between the African American community in general and the healthcare system. How has that been something that you have had to deal with? Are there other examples along that line that maybe spring to mind that we do not necessarily think of?

BS: Yes. I think probably the most blatant other example is what we were talking about in terms of anti-vaxxers and anti-maskers and skepticism about science in general. If we had had a different federal government, that wouldn't be as bad. If we had had a different CDC director at the time, it wouldn't be as bad. For example, Rochelle [Walensky], who is now the CDC Director, was just head of infectious disease at Mass General before this. She has no training or experience to be able to run a large bureaucracy like that. What she is--Wilensky is good at communicating. Typically, one of the classic teachings in public health is you need respected people and a consistent message and a consistent message given by the respected people. We had none of that before January 20th [2021]. This pandemic and how badly the U.S. has done with the pandemic has proven that point of how you need a respected point person. Tony Fauci was as close as we had, with his hands tied behind his back, in terms of the restrictions. Now, Tony and Rochelle are out there talking freely. But it clearly has worsened and has revealed the worsening of the science skepticism and the problems of science skepticism.

The inequities in the country are enormous and always have been. That is the nature of our country, and the pandemic has certainly brought it all very, very much to light. The people who tend to be underserved and sicker are the same people who were more likely to get COVID and, when they got COVID, were more likely to die from COVID. We're still not fully sure why research-wise--not lack of access to care if they're getting to the hospital. Why are they more likely to die when they get in the hospital? Some of it is clearly they are more likely to have ongoing diseases, obesity, diabetes, hypertension, other diseases uncontrolled, so they're at higher risk because of it. Some of it may be because of access problems; they come to care later.

There may or may not be genetic differences; we just don't know yet whether that's the case. But clearly, these are massive problems, and [there are] huge efforts to try to address it.

Shawna Hudson at RBHS just got a very, very large grant called the HEROES grant to try to study underserved communities and specifically study the issues in underserved communities. A lot of that targeted communication that we were talking about earlier has been targeted specifically to underserved communities. When we did the first Moderna trial in Newark, there was a backlash of the local community. It was done in Newark deliberately because they wanted minority representation because you need to know whether the vaccines are safe and effective in the populations who are at highest risk of getting the disease. On the other hand, for the reasons you're describing, there's skepticism about the medical community, very understandable, the medical research community in particular, very understandably, given the past history. We specifically went to a group in NJMS, New Jersey Medical School, that was used to dealing with HIV in underserved communities and a lot of public education, and they were the ones that did the Moderna trial in Newark. Still, there was a backlash and a backlash in cooperation. We mobilized the mayor to help us, and he was fantastic. But he, in turn, emphasized, "This is a study; it's voluntary. You do not have to enter the study. Nobody's forcing you to do anything" but encouraged people to do it. In order to know whether the vaccines worked in a diverse community, we needed it to be tested in a diverse community. [Editor's Note: The New Jersey Alliance for Clinical and Translational Science (NJ ACTS) at Rutgers University received a five-million-dollar National Institutes of Health grant to fund a study called the New Jersey Healthcare Essential WoRker Outreach and Education Study--Testing Overlooked Occupations, or NJ HEROES TOO.]

Certainly, a huge amount of our effort in clinical care always is--for example, University Hospital in Newark--serving exactly that population, and the same way at Robert Wood. In fact, in University Hospital, I told some of the anecdotes, but not only did they clear out the hospital to be nothing but a COVID hospital, but we, for example, shut down our dental school. The operating rooms became ICU rooms, and we shut down the dental school and used the dental chairs as hospital beds because they had access to oxygen and went for months without providing [dental care]. Of course, dentistry is one of the highest-risk professions in COVID. You're treating people with an open mouth and the saliva spitting as part of it. Again, they know how to use PPE. Fortunately, in retrospect, it's worked. We were one of the last places to shut down dental care in the state because of the fact that we serve a community that needed it, and when people had dental emergencies, they still needed to come. But when the hospital overflow got too bad, we shut down the dental practice and used those facilities to be able to provide that care.

SI: Paul, did you have a follow up?

PC: About this in particular, no. I do have another question.

SI: Yes, go ahead.

PC: This is, again, a broad question. You said earlier that recommendations change because the science changes. That makes complete sense. You have referenced frequently this study that

you have initiated from the very beginning about what was happening with the healthcare workers at Rutgers and the danger. So, I wondered if you could tell us a little bit about how those two stories go together in terms of planning. How quickly has it been the case that you actually do get new science that changes the way the science is being practiced? How do you explain to a lay audience what is humanly possible, especially at the beginning of this pandemic, in terms of figuring out any sort of question? Do masks work? Can you sit six feet away from somebody else and be safe? If you are working in a hospital, are you in a safe environment? Those are all things you study and you come up with answers to. What has been the fit between coming up with answers through academic epidemiology studies and actually the science, finding out things about how the virus is transmitted, and other sorts of questions like that? How has that worked?

BS: Yes, it's a great question. Historically, you're talking about pre-COVID, you're talking about at least months and typically years from when a question is posed to when you get answers, often many years. By the time you design the study, plan the study, write a proposal, submit it to NIH, it doesn't get funded at the time. That takes a year. You resubmit it and revise it; it's a second year. It's a five-year study. By the time you actually finish it, it's six or seven years. By the time it comes out after peer review, it's a ten-year process. That's the more normal process. That obviously doesn't work in the face of a pandemic. The world changed. Whoever imagined we could move so quickly? How often have things changed vis-à-vis COVID? Every day, new data is coming out, and people aren't waiting for it to be in peer-review journals. There's a whole level of preprint journals, they refer to--before they've been peer-reviewed--a lot of skepticism about whether they should ever be used before COVID.

I edit a journal. We refused to accept papers before this, to be clear, we refused to accept papers that had been released publicly otherwise and not gone through peer review. Now, everything is put in preprint journals first because that way, it gets out in the community immediately. It gets out and released, and ultimately under peer review, it can change. That's the risk of that process, but the facts change daily, given the enormous amount of work that's being done on this disease and the enormous amount of work that's been done on it and answers that are being attained and how much we don't know about it, which still remains enormous.

It's only been a year. This is a new organism. It didn't exist a year ago, or at this point, fifteen months ago. It actually probably did, but eighteen months ago may have been more likely when it started. We have learned an unbelievable amount unbelievably quickly. The scientific community worldwide has mobilized phenomenally to respond to it. The backlash and sequelae from that is yet to be seen in the future--the people who stopped studying other things because they're studying this instead.

That's the case clinically as well. At University Hospital in Newark, pre-COVID, its emergency room was so full that it was thinking about buying a nearby hospital to help with overflow. During COVID, it became nothing but a COVID hospital, as I alluded to. As COVID came under control in the summer, the emergency room was empty. Where are the heart attacks? Where are the strokes? Where are the other things? People are dying at home instead because they're not coming in. [There is] the whole question of what's going to happen as we coexist with this from a clinical point of view, from a research point of view, all the animals--we

probably sacrificed half of our animals because of shutting down our research enterprise--the lags in development of Alzheimer's, heart disease, all the other conditions, because everybody turned their attention to this. But it worked, and it worked incredibly well, incredibly successful. The scientific community rose to the occasion and continues to rise to the occasion.

We all discovered how much we can do on Zoom. Scientific meetings where you share this information were usually done in person. Now, it's all done via Zoom, and you know what? It works. So, it's going to be interesting to see how many meetings never come back in person, how many classes never come back in person because you can teach the class remotely just as well. More likely, it's going to be some kind of hybrid in terms of the teaching going forward, so kids can be on campus, given vaccinations, but may have a hybrid experience educationally, rather than fully in person, as was the case before.

Telemedicine: pre-pandemic it was there minimally. Now, it's a huge portion of the way medical care is being given. That's not going away because everybody loves it. Patients love it. Doctors love it. It's just very convenient. It's not going to replace in-person care. You need to do physical exams. You need to do testing and whatever, but it can replace a lot of it.

I jumped around; you asked about research. I jumped to clinical and educational stuff, too. My mind works as an academic healthcare person. Our world has changed in a permanent way.

SI: I was curious, too. We talked a lot about how barriers that had been there previously, bureaucratic barriers, came down to deal with this crisis. Aside from the issues we have talked about, like anti-vaxxers, that sort of thing, that this is a new form of something that has been continuing, are there other obstacles that you face in any of the three major areas that you deal with in your job that still you see as something that needs to come down or be dealt with?

BS: Interesting question. Let me answer in a couple of ways. One is some of the barriers that came down are coming back up again now that we are returning more toward normal. People aren't responding in as timely a way as they had to respond when it was critical. I think availability of resources will always be an issue. Manpower will always be an issue, whether you're talking about research, whether you're talking about clinical, whether you're talking about education, in the same way. I think clinical sites are an issue in terms of how many people we can train. There was a significant healthcare worker shortage before this. It was made much worse by COVID. We can't increase the number of students that we have because of the clinical sites. We have no lack of talented students. When I started, each of our two med schools had a class of 160 students. We used to get two thousand applicants. We now get over five thousand applicants, at each school. That was pre-COVID. That was not a national phenomenon. That's a Rutgers-only phenomenon. Since COVID, it has increased a lot more. That's a national phenomenon. People refer to it as the "Fauci effect." That's true in almost all of our schools. Where the rest of the schools in the University are worried about enrollment, we're bursting at the seams, but we can't enroll more because we're limited by the availability of clinical sites.

What has been accelerated by COVID is the movement of care from hospital to outpatient. That was already underway; it makes huge sense. Patients have found they don't need to come to the hospital anymore. Now, that COVID has backed off some--again, that'll change in the next few

weeks with the next surge--but now that COVID has backed off some, many hospitals are empty and losing money. So, you're going to start seeing cuts and elimination of acute care hospitals, which are important to us from a clinical side point of view in general but certainly from the teaching point of view as well. This has changed our world permanently. A lot of it is accelerating trends that were there before. Telehealth existed before. The fact that we're moving inpatient care to outpatient care existed before. It just pushed all of this much, much faster.

SI: As part of the community approach to this crisis, have you worked with your colleagues at other universities? What form has that taken? What have you learned from them? What do you think they have learned from you?

BS: Yes is the simple answer, and it varies in different situations. Clinical care-wise, we basically learned from their research and their experience. How are you doing this, how are you doing this? We collaborate on research projects across multiple medical centers. The vaccine studies are probably the most extreme example of that, which are worldwide studies, mobilizing people across the world. Research is inherently collaborative, and that certainly happens across the country, across the world. Clinical care is local because you're treating the individual patient, but you can learn from people and what they are doing and what the practices are doing.

In terms of prevention issues, it really is, in many ways, analogous to the question Taleen asked before, in terms of these other universities doing this. All universities, especially the Big Ten universities, are all sharing those experiences on what are they doing, what are best practices, what can we be doing, and what they may be doing wrong. We have even published our experiences, and others have been aggregated by societies, organizations, and newsletters. We've certainly heard lots of experiences from other universities where we've said, "We're not doing that because it's not safe enough." Opening up to in-person classes in the middle of the pandemic surge was a big mistake, as was opening dorms, as was unrestricted opening of athletic events. We've taken a huge financial hit, a huge financial hit, because we've looked out to protect the safety of our students and our staff and our faculty, a massive financial hit in the process, but the priority was safety. You can learn from your colleagues about what to do right, and you can learn also about what not to do. In the spring, this was largely a bi-coastal disease. In the summer, it was largely a center-of-the-country disease, because the coasts were doing the right thing. In the winter, it was everywhere. Now, for the fourth surge, it will be everywhere again. Certainly, we all learn from each other. We learned a lot by watching what happened in Italy before the tidal wave hit the U.S., anticipating what was going to happen. Unfortunately, we didn't prepare enough when we had the opportunity, as a country, to learn from this.

SI: First, are there things that we have not touched on regarding the last year and the crisis that we should include? Is there anything we missed?

BS: I think I can't underestimate--we didn't miss it--but I can't underestimate the impact and the stress, particularly on the clinical community, that the spring had and then sequelae after that, as we talked about. None of us have ever lived through anything like that. The stupidity, you look at people dying and healthcare workers getting sick and some dying while people in the streets are not getting vaccinated and not wearing a mask when they should have, so they didn't end up in the hospital needing that. It is appalling. Let me back up. None of this was necessary. All of

it was foreseeable. All of it was foreseen. If we had taken appropriate public health measures from the beginning, with the experience of what we learned watching China, with the experience that we learned watching Europe, we did not need a pandemic in the U.S. Other countries did it right and had very few cases and very few deaths in the process. It was just completely, completely mismanaged federally, and the net result--the irony is we went to war for a decade, over three thousand deaths, and we're now looking at so far at the time of this interview 550,000 deaths and there's still people sitting there, going, "Don't wear masks. Don't get vaccinated." Some people are stupid.

I think that's part of what we learned as well was that the subset of our population is just absolutely naïve and foolish. The question is, how do we, as scientists, try to prevent that for the next pandemic, because there will be others. It's not going to take another hundred years before this kind of thing happens again, and this could have been much worse. As bad and as terrible as it was, this is still a disease that killed only about two or three percent. The numbers still aren't clear. The case fatality rate is 10-20 times that of the flu, but it's markedly less than Ebola or other conditions like that. The good news for us, for the world, is viruses tend to evolve over time to become more contagious but less virulent, because as it becomes more contagious, it is more successful in spreading. You see that in the UK variant as an example, and that's why it's taking over and will be a key part of this whole surge. Typically, they become less virulent over time because if you kill your host, you can't spread. Now, the UK variant, unfortunately, is not less virulent; it's probably more virulent. But, over time, it will become more endemic as it becomes more contagious and less virulent, with the help of vaccines and boosters that we will need as variants come up.

SI: You had been emphasizing how this did not really need to happen. To follow up, when we initially started talking, you had said you were aware early on that there would be over half a million deaths in the U.S. over the next year. That was your prediction based on your experience. In doing that, do you take into account, "Oh, the federal government is not going to handle this well"?

BS: It's learning from the flu experience. We have twenty to fifty thousand people who die each year from the flu. People just accept that it will happen. Now, the vaccines aren't as effective for flu as they have been for COVID, but we tolerate the flu deaths and half the population doesn't get vaccinated, not even just the anti-vaxxers, but a lot of other people also don't get vaccinated for flu. We don't even traditionally recommend that sick people stay home. With COVID, we were looking at case fatality rates that were 10-20 times higher. Society does not always make rational scientific decisions. This could have been prevented, but my assumption, especially with the government that was in place in D.C. at that point, is that that wasn't going to happen.

SI: Taleen and Paul, do you have any questions before we move on to another subject? No, okay. Like we said, we will revisit the pandemic later on, as we're further downstream.

BS: I can tell you what it's going to look like. [laughter]

SI: Okay.

BS: In the next few weeks, it's going to get much worse as we go into the fourth surge, made worse by the public health measures not being followed, by the variants coming onboard, and by spring break. The cases are going to increase for the next few weeks, and then there'll be the usual two-week lag and the hospitalizations will increase. That's beginning to happen now. Then, two weeks after that, the deaths will increase. We will go through that same cycle we've gone through repeatedly before. We are not rational enough as a country to learn from the prior mistakes, but with these wonderful vaccines and the rapid distribution of them, hopefully it will be the last surge. At that point, it will become an endemic disease rather than a pandemic disease with these surges going forward. A couple of months ago, people talked about, "We're in a race between the vaccines and the variants," and some of my colleagues' responses were, "We've already lost the race." That's what you're seeing play out, but again, hopefully, this will be the last.

SI: In doing these interviews, we like to know a little bit about your background, to track how you came to be in your profession and in your field. Can you tell us a little bit about your family background, your parents and where they came from and so on?

BS: Sure. I'm the middle of three sons. My mother used to say she tried three times and gave up. [laughter] My parents are both American-born, but their parents were Eastern European. I grew up in New York City. They were basically Eastern European Jews who came to New York with the waves of Jews who immigrated to the U.S. in the early 1900s. That first generation were tailors and butchers and tradesmen of that kind. The second generation, my parent's generation, were businesspeople. My father owned real estate in New York and was in a business where what he wanted to do for his life was buy and sell buildings, but because they were rent-controlled, he could never sell them. So, he spent his time managing the buildings and learning to do things inexpensively. It was a real lesson for me as well, both learning about business but also learning about the importance of being happy in your career because it is what you wanted to do.

He tried to get each of his three sons into his business. Each of us spent summers in high school working with him, and not one of us was willing to do it after that. [laughter] My older brother became a cardiac surgeon. My younger brother became a vet. In our generation, we all went into the healthcare profession, ironically, all three of us, though in different ways.

Again, we grew up in a solid middle-class upbringing in Northeast Queens with an intuitive sense of--he worked endless hours, day and night, in a job that he didn't enjoy in order to provide for us. Both the family commitment and the career lessons there were important lessons. My mother was a housewife, so she never worked. She wanted to go to college. Her father, who was a tailor during the depression, said, "We can't afford it. We need you to go to work." She was offered scholarships to go to college but wasn't allowed to do that.

SI: Did your father go to college?

BS: He did, eventually, while working. He went to college and ultimately law school, but he finished it at night while he was working. He did that while working in the family business,

which at that point was real estate, again, intending it for buying and selling. So, he did go to college. He had a law degree to use in business. He never took the bar.

SI: Tell us a little bit about the area where you grew up. You mentioned it was Northeast Queens.

BS: Northeast Queens. We were right across the border, across the tracks, so to speak, from New Hyde Park. New Hyde Park was a wealthy Long Island area. We were much more solid middle class. Our immediate area was single homes. Beyond that, it was all garden apartments around us. I went to very big New York City public schools. Our high school was sized for eighteen-hundred kids, and we had five thousand. We were on triple session. There were only three grades in high school: ten through twelve. Ninth grade was in the junior high school. Tenth grade had the late session, so they ended at six PM. They started at eleven AM to six PM. The seniors started at six AM and ended at one PM or so, so people could go to work after that.

A very big public school like that was useful for both the top of the class and the bottom of the class because it was big enough to have special programs. The state limit on class size was thirty-seven. Classes weren't allowed to be more than thirty-seven. I only had one class in all of my high school education that was smaller than thirty-seven, but they were able to have special programs. I was in a special science honor program that a smaller school could not have provided. I still vividly remember my eighth grade science class with Mr. Gottlieb, where I learned an enormous amount about what science really was like, that it wasn't cookbook, it was discovery, what we were talking about before, and what scientists really do with their time. It had an enormous influence on me. To this date, when I talk about significant digits in my research and whatever, I never learned that later as a part of formal science. I learned that in tenth grade, so [that shows] the impact that education can have on somebody years later. Anyway, this was all a large New York City public school.

SI: Was there any kind of family influence that led you and your brothers to go into medical-related fields?

BS: Sure. The cliché is the definition of a lawyer is a Jewish boy who's afraid of blood. [laughter] There clearly was an element of, "You've got to be the doctor." Clearly, there was a sense that our generation should be professional and being a physician, from the perspective of financial security and otherwise--my parents grew up in the depression. Part of the reason, my father's situation, what I described to you in terms of taking on the buildings and never being able to sell them, is he took them on when they went bankrupt in the depression and so was able to get them at no cost, just paying back taxes, but then could never sell them. The idea that our generation shouldn't be subject to that, but security was paramount. At that point, medicine was also a solo profession; it gave you enormous autonomy. Our names, myself and my brothers, are Mark, Brian, and Jeffrey, given because you can't tell they're Jewish because of the enormous anti-Semitism that was present and the lack of opportunity because of being a minority. The idea of going into something that gives you that flexibility and gives you that control but is still education-related was very much part of what we grew up with.

SI: I am curious because a lot of Jewish Americans who I interview of your generation talk about how their parents, in bringing them up, faced the struggle between wanting to Americanize and wanting to hold on to tradition, religious or cultural tradition. How did that play out in your family?

BS: Yes, it's absolutely true. My parents mostly wanted to move away from cultural isolation and Americanize. They certainly weren't very religious. My brothers and I were even less religious. Interestingly, my kids are more religious than us. But still have a strong cultural identity. The other thing, keeping in mind, is that my parents' upbringing through the depression was through the Holocaust as well. So, it's not wanting to stand out because people who were Jewish get killed, and so that clearly was something we grew up with. My parents were not in the Holocaust, but some of their peers were and the generation before them. Those who were never talked about it. It's striking. Even now, some in their nineties won't talk about their experience. But that had such an unbelievably huge impact on the culture going forward. Yes, there clearly was a desire to Americanize, especially while still recognizing we should go to Hebrew School. I should know how to read Hebrew, even though I had no idea what I was reading, and I didn't know what it meant in any way. It was a weird way to learn--even though my parents couldn't read Hebrew--that we should grow up with that culture but at the same time be as Americanized as possible.

SI: Tell us a little bit more about your early education. You mentioned one teacher, Mr. Gottlieb, who was very influential. Were there other teachers or experiences that you think shaped your later life?

BS: Well, let me back up. Again, I went to local New York City public schools. The elementary school was P.S. 186 Queens, numbered like most New York City schools. Junior high school was a different school. Where we lived was on the border of two school districts, and I got shifted away from a lot of my friends, which was sort of traumatic, as part of that. They were heterogeneous schools, again, large enough that they could have special programs for the more advanced kids, as well as other special programs for the kids who weren't as advanced.

I remember being picked on a lot as a kid because I wasn't athletic, and I spent my time studying more. Hebrew School was four days a week, Monday through Thursday after school. So, I didn't participate in after-school sports as a part of that and got picked on for that reason as well. Most after-school sports then played on Saturdays. I was in services on Saturday, so I didn't participate as part of that. The sense of being different and exclusion that way was clearly there, and yet it's interesting because I grew up with the sense that the whole world was Jewish. I didn't know how much of a small minority we were because the area we lived in was so Jewish. It's a very weird mix. It wasn't until I went to college that I recognized what a small minority we, in fact, were.

I'm trying to think about other formative experiences. With Mr. Gottlieb, clearly from a career, scientific point of view. The other really important one was being in a big New York City public high school, we were graded at zero to 100 in 1-point intervals for our grades. The average was a straight average of our grades--it was a number--and that dictated our rank in our class. It wasn't an A, B, C system. It was a number system. At certain places in the average, like people

in the high eighties, being 0.1 point different could be a difference in rank in the class of a hundred places. Even at the top of the class, it was extraordinarily competitive. The person who had been my prime competitor at the time in school, who ended up going to Princeton and the University of Chicago, is a Nobel Prize-winning physicist now. The drive, you have to be that good in order to stand out because the numbers were so massive, it really was striking. It was not a user-friendly place in any way. It was cutthroat, cutthroat competition, rather than a place that was welcoming and friendly, but demanded a level of excellence and near perfection in the process that clearly impacted me thereafter.

SI: Taleen?

TJ: You mentioned the stress and competition with your other classmates, including this future Nobel Prize winner. Did you have a mentor during your high school career who guided you?

BS: No.

TJ: No?

BS: Never, never. The school was much too big. In fact, even in terms of college applications, they wouldn't let us apply to more than four schools. Half the school class didn't apply to any college, and the other half were allowed to apply to no more than four schools because they didn't have the college-advising capacity to handle more than that, meeting with you as an advisor and writing recommendations and so on. No, there was no mentoring at all. It was completely self-generated.

SI: In talking to other scientists who grew up in the New York area, sometimes they talk about access to more opportunities through museums, libraries and other programs. Do you remember any of that in your youth?

BS: That was sort of true but wasn't a big part of my upbringing because of where we lived. We were far enough from Manhattan by public transit that it is actually faster for me to get to Manhattan by public transit from where I live now, outside Philadelphia, than from where my parents lived within New York City. I debated going to Bronx High School of Science in terms of opportunity. But, again, to get to Bronx High School of Science from where I was would have been just an enormous, enormous commute. Fortunately, our high school had a reasonable science program anyway. It's unfortunate, but I actually learned to appreciate what Manhattan had to offer much more when I was in college in Connecticut and later in Philadelphia than when I was growing up in New York. We used to say we had the worst of everything New York had, being in the city limits with all the issues, without any of the advantages.

[RECORDING PAUSED]

SI: We are concluding this first session. Thank you very much, Dr. Strom. We really appreciate all your time today, and we look forward to continuing to learn more about your life and, eventually, your time here at Rutgers. Thank you very much.

BS: My pleasure. Take care. Bye.

SI: Thank you.

----------END OF INTERVIEW----------

Reviewed by Molly Graham 08/05/2021
Reviewed by Kathryn Tracy Rizzi 12/8/2021
Reviewed by Brian Strom 1/30/2022