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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Shaun Illingworth: This begins the second interview session with Dr. Brian Strom, on April 30, 2021, with Shaun Illingworth and …

Paul Clemens: Paul Clemens.

SI: Thank you very much for sitting down with us again. Last time, we left off talking about your high school career leading into college. You described your high school as very competitive. Can you talk about how that led into your college years, your decision of where to go to college, that sort of thing?

Brian Strom: Yes. As I think we talked about, but just to refresh, a class of eighteen-hundred kids, we were graded at zero to 100 in 1-point intervals. Near the top of the class, in the high eighties, a difference in average of a hundredth of a point could make a difference in class rank of a hundred people. At the top of the class, again, it was very competitive. My archrival there ultimately became a Nobel Prize-winning physicist. It really drove you to a level of excellence. On the other hand, classes were all big. In a big New York City public school, almost every class was thirty-seven, which was the legal maximum. I think the smallest class I ever had was an AP [Advanced Placement] English class, where we only had twenty, and that was only a single class that was anywhere close to that.

When it came to applying to colleges, because of the size of the class, we were only allowed to apply to four schools; they didn't provide college counseling for more than that. Normally, it was three, plus one of the city universities. At the very top of the class, they said, "You don't have to apply to the city universities; you can apply to one more if you want."

I spent the summer of my junior year in a summer science program at Brown University and very much enjoyed it. On the way back, I drove through New Haven. We figured, as tourists, let's just stop and see Yale. No one from our high school had ever in history gone to Yale before. People had applied, and they'd never gotten in. I had one extra application as a throwaway application. I figured, "I'll apply to Yale as the throwaway." I figured if I was lucky, I'd end up going to Brown. I got into Brown; that's where I thought I was going to be going. In those days that we still had telegrams, I was waitlisted at Yale and then ended up getting a telegram that I was accepted. So, I went to Yale.

My level of unsophistication about the university was striking in retrospect, particularly when we think [about] what we went through with our own kids. I didn't even know it was an all-male school at that point. I didn't know it was a jacket-and-tie school at that point. I was that naïve about what I was doing. Again, no one had ever gone there before from our high school, but that's where I chose to go. It was all male for the first two years.

I was interested in science and math, and so I went with the idea that I was going to major in physics. This was during the Vietnam War era. But the buzzword of our generation was "relevance." I was looking for something that would be relevant. Physics wasn't relevant enough, so I switched majors to Psychology, which at that point wasn't anywhere close to as rigorous a science as it is now. Psychology now is very rigorous, but that wasn't the case back then. That seemed too soft a field for me. So, I ended up majoring in molecular biochemistry

and biophysics, which at that point was a new field and a new major at the university. I was one of the first classes, maybe the first class ever to do it. Now, it's one of the biggest majors at Yale. That's what I went through and majored in as I went through.

Yale was an enormous culture shock for me, having grown up as a middle-class Jew from Queens in a massive high school. My class--I don't mean within a given class, but all the freshmen, all the sophomores--at Yale was smaller than it was in high school. I experienced a kind of people and a kind of excellence and a kind of expectation with that but also a kind of societal obligation, which was wonderful, but, again, very different than I had experienced before. As the university went coed in my junior year, the discussion was, "How many women are we going to accept?" They didn't reduce the number of men because "our job at Yale was to train the country's leaders, and men lead the country." Lots of implications to that obviously in current days and in retrospect. But there was this sense of noblesse oblige, that if you got to go to that special place, your job was to contribute back to the country or the world, as the case may be, in a way that it wasn't just going to school. It was much more than going to school. In fact, the faculty would get worried and upset if the students would spend too much time studying because the experience of the place was your colleagues and your peers and the interaction with each other and all the special things you did outside class and all the opportunities outside class. Anytime people started getting too grade-oriented, they would lower expectations or change the grading system because their goal was really to train leaders and have the interaction and the focus going forward of training leaders.

I didn't go with the idea of going to medical school at all. I sort of backed into that. Again, I was interested in molecular biochemistry and biophysics, as I alluded to. I was interested in things that were "relevant" in the process--the buzzword of the generation--but decided that medicine ended up being a good way of handling both because it would help people but at the same time was scientific, and the scientific background was useful. So, I went to medical school with that idea. I ended up going to [Johns] Hopkins [University] for med school.

What else can I say about the Yale experience? It was just such an amazing growth and culture shock, because I had never come in contact with people like that before in my life. It was a huge time of change for Yale also. We talked about the "Old Blue" and the "New Blue" because just a few years before that, Yale was basically just a finishing school and took mostly kids from prep schools. There was a deliberate decision by the university to become more socially conscious and to accept more kids from public schools instead. Those few years before when President [George W.] Bush was there as a student, prep school, athletic sports stuff, again, academics didn't matter as much. They still had a quota, no more than a hundred Jews a year. With the shift to the "New Blue," there was really an idea that it was going to be an academic school, and it was going to have a level of academic excellence. I think it became forty percent Jewish, if I remember right. So, it sort of went from a hundred Jews a year to forty percent. Minorities were allowed in, in a way that they never were allowed in before. It wasn't all just alumni kids. It was much more egalitarian and socially conscious in a way that the university never had been before. We, as public school kids, got to experience all that, but there were still plenty of private-school kids.

I remember I signed up for a freshmen seminar on philosophy, showed up the first day, and it was a class of ten kids. I'd never had a class anywhere close to that small before. This was the first session; there had been no homework yet. My classmates were discussing the writings of people who I had never heard of before because of the difference in what they experienced in prep school versus what we had experienced in a public-school education. I dropped that class very quickly. [laughter] What's interesting [about] the Yale experience, in retrospect, is that typically the public-school kids started out behind and ended up ahead of the private-school kids, the fact that you got in, the fact that you were used to competing and working that way. The public-private divide, the prep school kids came in with a big head start but coasted more, where the public-school kids were more serious about their education in the process. But it was an enormous growth experience for me in a way that often college isn't as much. College is obviously enormous growth for everybody, but the difference in culture between the way I grew up and what I experienced there was like night and day.

PC: Can I jump in and ask you a question about it? You mentioned two things. One is relevance. For one reason or another, you've certainly had a relevant career that Yale would be proud of. The other was training a whole generation of leaders. Did you have people who were with you at Yale who are your friends, your colleagues, or people you just think of who are leaders of society?

BS: Yes. You look at presidents; they're often Harvard or Yale graduates. You look at the Supreme Court; they're mostly Harvard and Yale graduates, Princeton to some degree as well. There definitely is an elitism, which in a public-school environment is seen as an insult, and at a place like Harvard and Yale and Princeton is seen as a compliment and a goal and a target. Yes, a lot of the people there became leaders in the country and in the field, no question.

PC: How about friends? Do you have friends that date from that period? You're talking about yourself as somewhat of an outsider in a prep-school world.

BS: I do. My college roommates, for example, I'm still very close to. They did not become leaders in that way however. They were public-school kids and didn't become leaders in the same way that some of the private-school kids did. We'd sit and spend endless hours talking at night in the dorm rooms, and discussions were all about, "When are you going to run for president?" and, "When are you going to run for president?" Literally, it was that kind of environment. Did any of them run for president? No, in terms of people that I was friends with. People did stratify, despite that. It would be interesting to look back as you look at subsequent generations of Yale people and leaders, did the shift to public school change that? It's an implication underlying it. But, certainly, the people I stayed friends with became leaders in their field or whatever, but they weren't national-level leaders.

Actually, one guy I'm not friendly with led the Innocence Project, in terms of getting people out of jail. He was one of the ones who in college was talking about when he was going to run for president, but he never did. Part of the reason perhaps is because he was a big druggie. Again, this was the late '60s; drugs were part of us.

I was in New Haven for the Bobby Seale trial. We had lots of tear gas that we ingested in the process. Yale's reaction to the Bobby Seale trial was, instead of closing off the university, was to open up the university. We, as students, all donated our food that we were going to have in the dining halls instead to be able to feed all the demonstrators and use the money to be able to feed the demonstrators in New Haven. The big, gorgeous courtyards of Yale were used to serve food to the demonstrators. We were involved in serving the food as well. Again, it gets back to this sort of noblesse oblige approach that instead of walling ourselves off, our goal was to help the world, even Bobby Seale. [Editor's Note: In 1970-1971, Bobby Seale, founder and chairman of the Black Panther Party, and Ericka Huggins, head of the party's New Haven chapter, were tried in New Haven for capital murder and kidnapping related to the 1969 murder of a party member suspected of being a police informant. The trial ended in a hung jury.]

The other big thing I didn't talk about was the draft and the impact of the draft. Again, this was the Vietnam era. I have vivid memories still of the night of the lottery, where based on what your birthday was you were going to go off to Vietnam or not. [I had] colleagues and friends who quit college the next day because they would have been drafted into the Army, and instead, they were going to go into the Air Force, which was the "gentlemen's service." So, they volunteered for the Air Force rather than being drafted. I got a deferment because, at that point, I was planning to go to medical school, and people going to medical school got deferments because of the expectation that you would go in later as a physician. But that was a big, big influence over our generation and culture. You wonder--and obviously, there's a whole literature--about when we moved from a drafted Army to volunteer Army, which changed the socioeconomic status of people in the Army and allowed middle and upper-class people to be able to say, "I don't need to worry about it," going to war becomes easier to do as a society as part of that. [Editor's Note: On December 1, 1969, the U.S. Selective Service held the Vietnam draft lottery, which was broadcast live on television and radio. The lottery selected birthdays to determine the order in which men born between 1944 and 1950 were called to report for induction in 1970 during the Vietnam War.]

SI: You mentioned that you were there when Yale opened up more opportunities for Jewish students. Was there still though some residual anti-Semitism? Did you feel that either from students or faculty?

BS: Interestingly, no. There was a tolerance of difference, period. There was certainly a sense of feeling like a fish out of water. I learned to play squash there, not on a team, but we had squash courts in every dorm. It was just part of the culture. Squash is obviously a Northeast prep school kind of sport. I had never heard of squash before. It was a huge culture change in education, but there was very little in terms of intolerance of any minority group. [It was] quite the opposite, given the culture, given the times perhaps as well. There was a clear sense of, "Yale needs to open up more to minorities. Yale needs to offer more opportunities to groups other than the traditional blue bloods that it always used to train." It was very tolerant.

SI: Do any of the professors stand out in your memory as influential on you or pushing you towards some of your future goals?

BS: Well, let me back up. The teacher that had the most influence on me was actually a high school teacher, Mr. Gottlieb. I still remember him. The advantage of the big high school is you could have special programs for the people at the bottom and at the top of the class. We had a special science honor program and track. He taught a class that taught me what science was really like. Some of the things I still do, I learned not as a scientist but from him.

In fact, I just met with the education school [Rutgers Graduate School of Education] people at Rutgers with the idea of--clearly, we've trained a generation of people in K-to-twelve education, some of whom don't understand what science really is. That is a big issue. How can we, at RBHS [Rutgers Biomedical and Health Sciences], mobilize our capacity to help them, the education school, to really do a better job of teaching science? Typically, the people who go into high school science education are the failures in science; otherwise, you would become a university faculty member or go into industry or whatever.

I was always frustrated with my kids' science education because science was taught as cookbook. Doing a lab experiment, if it doesn't turn out right, well, you did something wrong, like a recipe that turned out wrong, as opposed to this is the opportunity for discovery and the excitement and the idea that science is discovery. Epidemiology, my field, in some ways--I'm biased, of course--is the extreme of that, in terms of detective work. We're even sometimes called in on crimes. That sense of science as discovery really came from high school.

What I saw in college didn't have anywhere near that kind of impact on me because science at that point at Yale wasn't that strong. It was much more of a humanities school in its focus. It still is. The people who taught the undergraduate science classes were doing it out of obligation, not because it was something that they were really committed to. The one teacher I vividly remember from college was actually an art history teacher, who basically gave these inspiring talks about art, particularly architecture, through the years. It wasn't the science teachers. Maybe it's part of why I didn't go into lab science. [laughter]

SI: Again, you were there during the Vietnam War. Also, the civil rights movement was a major issue, and there were other major social and cultural changes. Do any of those stand out as having a particular impact on your life, either in changing the way you presented yourself or the idea of other things you wanted to do in your life?

BS: Yes, and particularly the two that you mentioned. The Vietnam War probably encouraged me to go into medicine for the deferment, as part of it, in addition to the entire anti-war ethos that we all had in that era. The other was being politically active. It was very comfortable at a place like Yale, where you're taught to be a leader anyway, in terms of don't accept things the way they are, but be in a position to change them and being a change agent. That certainly had a huge impact on a lot of what I've done career-wise since then. Civil rights, the same way. Caring about people and minorities who weren't treated as well. You have an obligation to be able to help people who don't have the privilege that you grew up with. I may not have grown up with the privilege of the prep-school kids, but certainly I didn't grow up in a ghetto and I grew up with an excellent education within a public-school environment. Yes, those both had big impacts on what I wanted to do going forward.

SI: Tell us about transitioning to medical school at Johns Hopkins.

BS: That too was another very big culture change in a very different way. Hopkins, in some ways, even as an undergraduate school and as a graduate school, was the opposite of Yale. It cared only about pure academics. It is primarily, or was--I think it still is--a graduate and professional school. They didn't care about undergrads, where Yale cared only about undergrads, and the graduate schools and professional schools were sort of add-ons, but the entire university focused on the undergrads. Any faculty member at Yale had to teach some undergrads. They often told the story of a star they were recruiting who said, "As part of my coming to Yale, I want to get out of teaching this course." The answer was, "Well, then you should go elsewhere because that's not what we're about." Hopkins revolved around its graduate education and its professional education, particularly the medical school, and had very, very high demands and expectations of us as medical students, but we basically worked day and night. That was the expectation. What became clear to me years later was that the top of any medical school class is indistinguishable. They're great students. Medical schools are so selective that you can be great anywhere. The difference is that at a place like Hopkins, the bottom of the class is still excellent because of both the combination of selectivity and the demands and expectations.

It was not a particularly pleasant place to be at all. People were unhappy. There are endless stories I could tell you of how they mistreated students and how they mistreated not just students. Maryland is south of the Mason Dixon line. We had histology slide collections, historic ones, that had specimens from chopped up Africans who were stowed away on ships and ended up landing in the Baltimore Harbor and were lynched when they arrived and were chopped up and handed to Hopkins for its slide collection. It was not very long before I got there, just a few years before I got there, that the Osler wards, the normal Hopkins hospital wards, were not male and female; they were white male, white female, Black male, Black female, as separate wards--that recently. Maryland was part of the North, but it was south of the Mason Dixon line. So, it was in this in-between thing. That history of prejudice against African Americans, against Blacks, was very, very obvious and transparent there.

It basically was, in some ways, the opposite of Yale as an intolerant area. It was intolerant of a lot of things. It was tolerant of people's behavior not being okay. I spent a summer, my first summer there, walking back and forth to your car--back up, the medical school dorm was right across the street. It was in the middle of a ghetto. The medical school is in one of the worst areas in the city. There were pictures of the 1968 riots of the buildings burning and the medical students playing tennis during the burning, where you have the pictures where you see people playing tennis, and behind them, the buildings are burning. It was that level of callousness toward people. The medical students were also considered expendable. We didn't get parking. The neighborhood was patrolled with guard dogs and helicopters with searchlights. So, you'd walk across the street to the hospital, and suddenly where you are would light up enormously because of the searchlight that would come on you. It was that level of security. It was a fortress to protect itself against the neighborhood rather than embrace the neighborhood. But they felt it was okay. I parked in the community because I didn't have parking; we were expendable. I had a particular place that I tended to park. I would get to know the people I was walking by. Baltimore is known for its stoops, for its row houses and people sitting on the stoops.

Particularly in the summer, it was hot; people would sit on the stoops. I got to know neighbors who would be walking by and saying hi to. At one point, it was almost dark when I did that. One of the people I [became] friends with I still vividly remember [saying], "Hey, man, you gotta get out of here. Get to your car fast. It ain't safe for you to be in this neighborhood this time of night." It was really a fortress mentality, being against the community instead of for the community and wanting to invest nothing in the community. The community was something that was an obligation--not even an obligation, just something that they had to tolerate. That's still very much an issue in Baltimore.

We did studies in science with HeLa cells--H-E-L-A--as an experiment. HeLa comes from Henrietta Lacks. Her cells were taken and [have been] useful scientifically, experimentally for a particular reason. [She was] somebody who lived in the neighborhood in Baltimore. She and her offspring never got a penny for that, and yet these are cells used experimentally still to this day to do all sorts of laboratory experiments. Again, the callousness of the neighborhood versus the university was striking. [Editor's Note: HeLa cells are the most widely used cell line in biological research. The cell line originated from tissues taken from Henrietta Lacks, an African American woman who was being treated for cervical cancer and ultimately died from cancer in 1951 at the age of thirty-one. During her treatment, Johns Hopkins Hospital took the tissue samples from Lacks without her consent. *The Immortal Life of Henrietta Lacks* by Rebecca Skloot explores the life of Henrietta Lacks, the development of the cell line, and the ethical implications of the HeLa cell line benefitting scientific research and ultimately generating profits for pharmaceutical companies, while Lacks' descendants have never received any compensation.]

What else? Again, working day and night, abused. At one point, in applying for residencies, our residents were on call in internal medicine two out of three nights. The rigidity, grand rounds was Saturday morning at eight o'clock because that's when other people could come. A thousand people would show up for it. As an intern when you presented cases, you had to present by heart. The details of the case were on a slide behind you. You weren't allowed to turn around and look at it. You had to know it all by heart. Every time we presented a case on ward rounds, even as a student, you had to know all of it by heart. You needed to stand at attention at the patient's head, making the presentation right in front of the patient as if they weren't there. Again, the callousness, the rigidity, people were treated that badly. At two o'clock in the morning, at least shirt and tie twenty-four/seven for the house staff, even though you're on call continuously. One of the interns once rolled up their sleeves at two in the morning. I'm not sure how it was found out, but [they] got balled out by the chair of the department for doing that. I asked them, "Did you ever think of making things easier, like being on call only every day and every other night?" The answer I got was, "We'd make it every day and every night if we thought people could survive," because otherwise you're missing clinical experience. It's where people got the name "residents" and "house officer" because they lived in the hospital; they were residents in the hospital and they lived in the hospital. That's where those words came from. Those are Hopkins traditions and the Hopkins attitude of abusing the people you're with.

One of my colleagues actually had gone to high school with me, went to college with me--another Yale first from our high school--and ended up going to Hopkins for medical school. We were never close friends but certainly knew each other well. [He] didn't want to stay at Hopkins but made the mistake of ranking them anyway on the match list. I didn't want to stay [and] did

not rank them on the match list. But he ranked them and he ranked them last. As he went around and interviewed, the chairman of the Department of Medicine, whose name was "Mac" Harvey, A. McGehee Harvey, he would be told on interview at other schools, "Boy, what did you do that Mac Harvey disliked you so much?" The recommendation letter was extremely negative, and yet he matched with Hopkins. They deliberately blackballed him, so he would end up at Hopkins. The experience was so difficult and negative that midway through his internship, he checked into the psychiatric hospital, he couldn't handle it. Ultimately, he became a pathologist, where he didn't interact with people, just with specimens instead, sort of destroying his career in the process. [Editor's Note: The match process of the National Resident Matching Program is a uniform system under which residency candidates and residency programs "match" to fill first year and second-year post-graduate training positions.]

That was the kind of atmosphere Hopkins was, in contrast to the kind of atmosphere that Yale was, or Penn--I haven't gotten there yet. It was striking. Again, a level of excellence, a level of history, you were trained extraordinarily well, but from my point of view, it was not worth what you went through. I certainly have no loyalty to Hopkins whatsoever, in contrast to Yale. It's basically day and night.

The other thing is their attitude was they have the national and international experts; that's what they were going to lecture us on, not on the basics, not on what you needed to know to be a physician. They're lecturing you on their research. You need to translate the work that's been done in the field into what matters. That's up to you; you do that on your own. They're not going to waste their time teaching down to a student level. It was, again, a striking contrast from that perspective. Again, if I had been better advised or knew better, I wouldn't have gone to Hopkins. The other place I was considering, Rochester, was a much more friendly school, and a much better school then than it is now, probably as good as Hopkins was then. Hopkins was a very unfriendly place in those days. It's changed some. It's not as bad as it was. That's its history and culture.

SI: Why did you decide on internal medicine?

BS: To me, internal medicine, it's sort of analogous to clinical pharmacology--and I should talk about my summer experiences at Hopkins, too. They were very formative. To me, every physician practices medicine. Diagnosis and treatment of disease, the internist is the one who does it better. Same analogy why I went into clinical pharmacology, any internist uses drugs. The clinical pharmacologists are the experts in using drugs within that. In a field which is vastly broad, it was an attempt to narrow without narrowing it too much and narrow it in an area that I could have an expertise that I would be comfortable with.

To talk about the summers, I talked about at Yale I was politicized, as I alluded to. One of the things I did during my first year of medical school, there was a faculty member at Hopkins who was on the state legislature. So, I went to him and said, "Is there anything I can do research-wise," because I still wanted it to be rigorous and scientific, "that would help you policy-wise in your research?" He had just passed a law that was the first state repealing--what ultimately all states did partially or fully repealing--what are called anti-substitution laws, where when a physician prescribes by brand name, you can substitute a generic equivalent. All fifty states had

that law. Maryland was the first state to partially repeal it. He said, "What about doing a study that might quantify what the impact of that was?" I found a program in the School of Public Health. The Hopkins School of Public Health was fantastic. It is right across the street from the medical school. The street between is called Wolfe Street. People talked about Wolfe Street being the widest street in the world. People did not cross between them. Even though I was interested in epidemiology, as a medical student I had no courses in epidemiology or biostatistics. The calendars were incompatible. I couldn't, in fact. Not only didn't I have one as a medical student, but, in fact, even [if I were] interested, I couldn't.

I was the only medical student in my class to go into the School of Public Health building, except to the cafeteria, which was the best on campus. But I found a program in the School of Public Health to support medical students in a summer program. That supported me that summer. I did research. I worked with a young faculty member who was in epidemiology at the time [and] got me more interested in epidemiology in the process. [I] ended up doing research, published three papers from it, that were of policy relevance linked to this faculty member. It also helped me realize an interest in drugs. The other thing that was formative in terms of my interest in drugs, meaning pharmaceuticals, as opposed to our college experiences, was that it was clear that as you drilled down in common clinical questions--do you use digoxin in somebody with a heart attack? You look at the textbook, it has references. You look at those references, they have references. Ultimately, there's no basis underlying much of it. Much of medicine was not scientifically founded. Basically, it's a profession where you practice because that's the way you're taught.

In fact, if you ever visited Colonial Williamsburg, medicine and pharmacy were the same professions at that point. The way you were taught was it was an apprenticeship, like being a plumber. You'd work under the tutelage of somebody, endless hours, sleep there still, until you'd put in enough years that you get certified, and you can become a card-carrying member yourself. As the fields split, pharmacy became more professional. Medicine is still doing the apprenticeship thing. We call them internships and residencies in terms of the way we train people. But a lot of medicine was still art, not science.

I got interested in how to properly use drugs, what is the real science underlying drugs, and it happened that that summer policy experience also involved drugs. That combination of experiences really led to my career interest in studying the effects of pharmaceuticals, how people use pharmaceuticals, rationalizing the way people use pharmaceuticals going forward. Those were really very formative experiences.

The summer after my second year of medical school, I went to West Virginia coal-mining country, Morgantown, West Virginia, to NIOSH, the National Institute for Occupational Safety and Health, and did pulmonary physiology research on coal miners. I didn't enjoy it, in terms of the isolation of West Virginia. I didn't enjoy the lab research as much as I had enjoyed the policy research of the year before, which was important to my career decisions going forward.

But the other experience I had there, which was striking and had a lot of influence on me later, was I finished this research, I wrote up the manuscript, went back to school, sending drafts of the manuscript back and forth to my mentor. He stopped responding. After many months, I finally

started getting responses, I submitted the paper for publication, and the journal's answer was, "I don't understand, these data have already been published." He published my data, stealing from me, as a trainee, in the process. That was very eye-opening from a scientific ethics point of view and how you treat your trainees' point of view, which influenced me a lot going forward. It was the first of two such episodes I had in my career going forward. The other was much later. It's basically trainees having their work taken from them.

In science and medicine, that is not that exceptional. Harvard classically does that routinely. It's a great place to recruit people from, brilliant people who know they have no future because their work basically gets used by the senior people as part of it. People stay for the sake of the Harvard name. Much of medicine nationwide, though, doesn't do that anymore, and certainly, we don't do that here. The couple of times I've ever heard of it, I certainly haven't tolerated that. Again, it was eye-opening in terms of how you treat trainees and how you trained people going forward.

PC: You know the story about Rutgers, the streptomycin story.

BS: I know about streptomycin. I didn't know [there was a story].

PC: It's a major controversy in medical ethics. There was no medical school there. It was, I guess, over in the Ag School where he [Dr. Selman Waksman] was working. He gets the Nobel Prize, but he takes a lot of the lab research that other people had done. Exactly what happened in that has always been a matter of controversy. There are actually books published on it; it's famous enough.

BS: Fascinating.

PC: It is not an airtight story. It's got all sorts of holes in it, but it's quite something. Just a quick question, where did you go in West Virginia to do your work?

BC: Morgantown, West Virginia University, though we made trips in mobile vans to the coal mines.

PC: I know West Virginia coal mines. That's my family history. I know what it means to get black lung disease.

BS: I mean, these people, mostly they came into Morgantown. But it was, again, another huge cultural experience to come across people--it couldn't be [more] different growing up in suburban Queens--looking at people who were working incredibly hard, incredible hours in phenomenally bad environments and getting sick from it because of their dedication to their work.

SI: After Johns Hopkins, you went out to California on an NIH [National Institutes of Health] fellowship. Is that right?

BS: The NIH fellowship was in California, but that was later. I went out to California to be an intern and resident. I went to the University of California San Francisco [UCSF] for my internship and residency. Part of the reason was a reaction to Hopkins, in terms of wanting to be at a pleasant place and a nice place and a friendly place. You look out the windows and see these incredible views, very different than the views we saw in Baltimore. Also, it was one of the top programs in the country. UCSF and Mass General [Massachusetts General Hospital] were the top places in the country, but Mass General had the same culture as Hopkins. UCSF was very different. It also was an easier program. It was only every day and every third night, instead of every day and every other night, which many places had. Hopkins was every day and two out of three nights. You had no days off. No, we had two weeks a year off, and that's it. But it was an opportunity to have a little bit of a work-life balance. We never used that term in those days. Certainly, my son, who's now a physician on a faculty in Boston, I tease him all the time about how easy he has it. We thought of this as much easier compared to the alternative.

UCSF was a fantastic place. It was great training, the best people in the country. People were recruited from all over the place. The head of the residency program was also a clinical pharmacologist. That, again, reinforced my drug interest going forward. I was still interested in policy. When it came to thinking about fellowship training after residency, I wanted to stay in San Francisco at that point. I was thinking I'd probably stay there forever. It was such a wonderful place to live.

There was a program, the Clinical Scholars Program, funded by the Robert Wood Johnson Foundation, which was health-related social sciences. So, that was the policy piece. I was also interested in clinical pharmacology. I went to the head of the clinical pharmacology program and to the head of the Clinical Scholars Program and said, "Can I work something out jointly?", something that became my hallmark career-wise, in terms of bridging between fields and trying to do that. But the two of them hated each other; one had tried to block the other one's tenure. [laughter] So, it didn't work as a joint program.

I went with what, at that point, was the more conventional approach with clinical pharmacology. The head of the program, who was a cell biologist, took me on himself as his mentee. He was interested in doing that, despite the fact that I certainly wasn't doing cell biology, because he was appointed as head of a national commission, the Joint Commission on Prescription Drug Use. He saw taking me on as a way to make an academic experience out of that activity. As the commission proceeded, as it had its meetings around the country, I went with him. In fact, even though I combined the clinical pharmacology fellowship with public health training at Berkeley, most of what I really learned about epidemiology wasn't in my public health training at Berkeley; it was really from the commission. As the commission got educated, I got educated. I wrote the commission report as a consultant to the commission. In the meantime, very policy-related again, focusing on drugs and how do you properly use drugs, how should we be studying drugs. In the field of what was then called drug epidemiology, there were, at that point, probably only six people in the field or fewer, two groups in Boston and one person in Philadelphia. That one person in Philadelphia was the person who as a junior faculty member I had worked with that summer at Hopkins--not the politician, but the epidemiologist.

I realized that the tool I wanted research-wise was epidemiology. Again, I did the Master of Public Health as a hobby on the side. I took BART, the subway in San Francisco, Bay Area Rapid Transit, back and forth between San Francisco and Berkeley. There was never a time I wasn't done with the homework by the time I got back to San Francisco. It was a distinctly undemanding curriculum, but I had from it formal training in epi [epidemiology] and biostat [biostatistics]. Most of what I learned there that was useful was the biostat because the epi I learned much more with the commission, as I alluded to, but basically wrote the commission report as part of that, again, realizing the research tool I wanted was epi.

My primary mentor was the cell biologist. How do I learn epi in the process? We found someone who I thought--still think--was probably one of the most rigorous epidemiologists in the country, if not the world, Olli Miettinen at Harvard, and took him on as an additional mentor, or he took me on as an additional mentee. The model of what I later developed as a training program of having three mentors--a primary mentor, a second methodologic mentor or content area mentor, as the case may be, and a biostatistician, I developed the entire training program with later--really came out of my experience that way.

Olli was three thousand miles away; that was probably close enough. As I learned later, he prided himself on reducing his Harvard students to tears. Later in my fellowship, he sent me a paper to review, to get my comments on. One of my comments was--I made substantive comments--I said, "But Olli, Ken Melmon," the cell biologist I was working with, "and I should be co-authors of this. This is completely lifted from the work we had been doing." He agreed to it and then struck our names in the galleys. [laughter] That was the second experience that I told you about of having work stolen. But I got incredibly rigorous epidemiology training from Olli, an incredibly good thinker, as well as learning how to mentor in a way that epidemiologists typically didn't from my mentor in cell biology because lab scientists did that. Typically, epidemiology was something you learned in classrooms, but lab scientists did close mentoring.

My mentor, a cell biologist, ended up going to Stanford as chair of the Department of Medicine at Stanford. I stayed at San Francisco because I wasn't tied to a lab, so the distance wasn't an issue. The clinical program in clinical pharmacology was better developed in San Francisco.

When it came to looking at faculty positions, I was looking in clinical pharmacology because that's what my training was; it was in clinical pharmacology. The vice chair of the Joint Commission on Prescription Drug Use was a clinical pharmacologist at Cornell. When I wrote to my mentor from medical school, the epidemiologist who I had worked with over the summer, I asked him, "Do you know of any clinical pharmacology positions available?" His answer was, "No, but I have this position [at the University of Pennsylvania] in clinical epidemiology as part of general internal medicine. Is that something you'd be interested in?" I'd never heard of clinical epi. I'd never heard of general internal medicine. UCSF didn't have either one. But as I considered it, I realized that was a better place to do what I wanted to do than a clinical pharmacology environment. My other final choice was at Cornell with the person who had been vice chair of the commission. So, my final choices were between those two.

Then, in addition, I considered a position at Stanford because my mentor sat and said to me, "At least do me the courtesy." He actually threatened me. "At least do me the courtesy of looking at

the position at Stanford" that he opened up, that he found at Stanford, where he was chair of medicine. He went through all of that, and he literally said to me, "Whatever you can get, I can un-get for you. At least do me the courtesy." I said, "I've already accepted a position at Penn." So, I did look at a position at Stanford as well, never seriously. My final choices were between Penn and Cornell. Cornell was a clinical pharmacology environment; Penn was a clinical epi environment. I realized what I wanted to do I could do better there in a clinical epi environment.

Now, I joined a program at Penn where I was the second of two faculty in a program that, at that point, had seven people total, two faculty and five staff. What was clear all along is I enjoyed administration. I trained at UCSF in clinical pharmacology. It was probably the number one or two clinical pharmacology program in the country. When my mentor left for Stanford, they were doing a search for division chief to be head of this program. They offered it to me as a fellow. I was wise enough, surprisingly in retrospect, to turn it down. I needed to build my own academic career first before becoming head of a big administrative program.

In moving to Penn, I was co-director of this clinical epi program, but it was co-director of a program of two faculty and seven people, including the two faculty. It was very small, so I could build my own academic career in the process. The irony is our business administrator, one of the five others at the time, said she quickly learned that if she wanted a signature, she'd go to Paul; if she wanted a decision, she'd come to me. My wife teased me--still teases me--that some people read novels; I read budgets. I was the odd academic that very much enjoyed administration and did from the beginning, but we built our program in parallel to my building my career.

When my co-director left Penn to go to the University of Maryland, we at that point were twenty people, six faculty and fourteen others. I formed a center and a department [Center for Clinical Epidemiology and Biostatistics (CCEB)]. When I stepped down fifteen years later, we were six hundred people, 175 faculty, six hundred people total, all built on soft money. We never got a penny from the school. Quite the opposite, the school was taking a tax on what we were bringing in all along the way, rather than supporting us. It was all built, in a sense, almost over the objection of the school, rather than supported by the school. But it was interdisciplinary, and that interdisciplinary focus was key to who I learned I was. Clinical pharmacology is a bridging field between clinical medicine and pharmacology. Clinical epi bridges between clinical medicine and epidemiology. My field of pharmacoepidemiology, as we ultimately called it, bridges between clinical pharmacology and epidemiology. Even general internal medicine is broad. What I learned is I loved building excellence. We built the best program in the world. I loved building interdisciplinary programs. I loved linking programs.

One of the roles I played at Penn toward the end of my career, when I stepped down from being head of that program to a position in the dean's office, was to be the ambassador to the other schools in the university. On one hand, we were one of only, as we kept being told, twelve schools, but we were half the university, much more than that by budget, but half the university in terms of the number of faculty and number of tenured faculty and so on. Unlike much of the rest of the medical school, I understood social sciences, being an epidemiologist, and could communicate and interact with the other schools. My job was to be an ambassador to the other schools, looking for programs, again, bridging. That bridging was central to who I was and what I wanted to do and what I wanted to build. My center that I built was within a medical school

[Perelman School of Medicine]. We ultimately were bigger than every school of public health in the country except Hopkins, which dwarfed us. But we never became a separate school because I didn't want to pull it out of the medical school. Again, it was bridging. Our goal was to bridge across clinical departments and into our basic science department, across all of them, rather than pull it into a separate school, which creates silos and gaps. Again, that idea of building and bridging have really been central to my career.

Every time I got antsy and started looking elsewhere, Penn found something else for me to do, as I built my career. My wife would keep saying, "Instead of what?" I could never answer that part; it was always "in addition" instead of "instead." [laughter] But that kept me excited and interested because I liked building. As I look back at my Wikipedia page or whatever, I'm the founding or inaugural head of essentially everything I had done at Penn and continued that way here as being the Inaugural Chancellor [of Rutgers Biomedical and Health Sciences (RBHS)]. Each thing we did was a first along the way, and I enjoyed being innovative administratively. I saw administration as a way to do innovative things, not as a way of getting in the way. As I say here all the time, people should do what makes academic sense, and I'll change the rules to accommodate it. People shouldn't compromise what they need to do academically in order to fit the administrative rules. The administrative rules should foster what you want to do academically, not otherwise.

Every time the UMDNJ [University of Medicine and Dentistry of New Jersey] presidency became available, I was asked to look at it and never even would be willing to look at it, given the quality of the institution. But when UMDNJ merged into Rutgers creating this chancellor position, again, inaugural, multiple people sent me this job description, saying, "Brian, this one's for you." I looked at it, and I said, "This one is for me." The ability to build one of the best medical centers in the country, the potential here was unbelievable. The status was pretty mediocre at the start; it ended up being even worse than I realized. But I saw the potential in what could be done and the excellence that could be built going forward and applied for it. Ironically, as I found out after the fact, when the search firm asked what kind of person they should look for, she pulled up my webpage. [laughter] Clearly, she knew me from other searches, other things that I had looked at.

Again, from people on the search committee afterwards, in retrospect, I, by coincidence, was the first person interviewing in the airport interviews, and the discussion afterward was, "We've obviously found the right person. Why are we wasting the rest of our time?" I mean, obviously, they continued the job [search]. This was the right position for me. The search committee obviously felt that way. [Robert] Barchi obviously felt that way. I felt that way. Penn was willing to give me anything I wanted to stay. Even after I'd accepted the position here, they kept coming to me, going, "What can we do to get you to change your mind and stay here?" I said to them, "There's nothing you can do. There's nothing Penn has that could possibly be better suited to what I want to do and what I enjoy than this," though the job search was important for me to learn about myself, to realize that, in terms of what I enjoyed and what kind of things I most want to do. Let me pause there before moving to Rutgers.

SI: You also had such an impressive career working in these professional associations and in collaborative efforts during your time at Penn. Do you want to summarize some of that work or

talk about what interested you the most about working with groups of colleagues at other universities?

BS: Sure. The field I built was, again, what we early on called drug epidemiology, later renamed pharmacoepidemiology, so people didn't say, "Oh, you study opiates." When I began and came to Philly, there were six of us--the two groups in Boston and now the group in Philly, i.e., the two of us. We collaborated with both groups in Boston, who hated each other, again, a difference in style. Ultimately, one of the groups turned to us and said, "If you're going to continue to work with the other group, we're not going to work with you again." We were not going to be blackmailed, so that's what happened. Working collaboratively with other people is really central, and we really built a field in pharmacoepi which is international but is a reaction to that experience as well, in terms of very few people, no offspring. I spent a lot of time training other people. I've trained a couple of hundred trainees of my own, people for the field, with a sense of collaboration. My job was to train them. It's their research that matters, not my research. I helped them choose their own projects. It's the opposite of stealing stuff, in terms of my job was to support them in doing it.

We really developed the field of pharmacoepidemiology. I still edit the international journal. I'm still the editor/author of the primary text in the field, now in the sixth edition, and just finished the third edition of the textbook version of it, the sixth edition of the reference book. [Editor's Note: Dr. Strom is the Editor-in-Chief of *Pharmacoepidemiology and Drug Safety*, the official journal of the International Society for Pharmacoepidemiology. He is the editor of *Pharmacoepidemiology*, along with co-editors Stephen E. Kimmel and Sean Hennessy.] But [we] really built the field of pharmacoepidemiology as a field focusing on drug safety. How do you deal with rare adverse reactions to marketed products, like clotting from the J&J vaccine? That pharmacovigilance, that system, that's my work. That's the kind of thing we equipped the country to do. Personally, I think the FDA [Food and Drug Administration] overreacted to it. I was one of the founding people on what was, what still is, the FDA's advisory committee, the Drug Safety and Risk Management Advisory Committee, focusing on and really looking at adverse reactions to drugs.

That became very natural in terms of working with other people. Our field is an international field. Pharmacoepi is an international field. We do very large studies. A clinical pharmacologist does a study of ten people. You do a study of less than thirty people, you use nonparametric statistics. My biostatistician, early on in the '80s, used to tease me; if I did a study of a thousand people, I would use nonparametric statistics because it was small compared to what we normally do. We do studies of tens of millions of people now. We work with a database of 150 million people. The computing capacity was clearly a part of it, but the field is inherently collaborative internationally but enormously policy-related.

I've been involved in lots and lots of Institute of Medicine committees on difficult policy decisions. I've mostly chaired them; the IOM [Institute of Medicine] likes to ask me to chair committees. I like to chair the committees. That way, I can make sure I can be at the meetings. [laughter] I like bringing people to consensus who have a very diverse view. I do like being a maverick. We issued a committee report saying, "Salt in diet doesn't matter" over the objection of the CDC [Centers for Disease Control and Prevention] that funded the committee, wanting it

to say the opposite. The committee was stacked toward the opposite, but I'll follow the science wherever the science goes. I've been involved in a lot of policy-related committees with the FDA, with the Institute of Medicine, now called the National Academy of Medicine, making policy recommendations from our science. You see how it bridges my desire for policy and my desire for rigorous quantitative science. I should say, by the way, I don't think I mentioned that math was always something I loved. I would take calculus in big New York City public school classes, thirty-seven kids. We'd be given the exam in the beginning of the class for an hour exam, and ten, fifteen minutes later, I was done with it. But they didn't let us leave. So, I sat there calculating--I still remember--calculating the square root of two to a hundred decimal places just to keep myself busy in terms of what I had to do while I was stuck in the classroom for all that time. Math was always something I really enjoyed. Policy was something [I enjoyed], and you see how I built the career that ultimately involved a lot of international collaboration and a lot of international policy work as part of that.

Certainly, we're a very international field. We built our field. When I started, there were six of us. We now have an international society of fifteen hundred people, again, an international journal. Building interdisciplinary work and excellence is key.

Even in terms of pharmacoepi, classically people were either clinical pharmacologists, where they reviewed individual cases, like the individual cases of clotting from a J&J vaccine, and tried to come up with judgments about was it due to the exposure or not, judgments which typically you can't really make scientifically; it doesn't make sense. The flipside is where classic epidemiologists or population people don't understand the drugs they're studying and don't understand that drugs are different in lots of ways. They're given different regimens, different doses. Most importantly, they're given to people who are sick. Differentiating what's due to the drug and what's due to the underlying illness is hard. Again, I was bridging the two between epidemiology and clinical pharmacology and built the field accordingly.

SI: Since this was so new, you're building not only a field but also a network and you did all this on soft money, as you noted, was it difficult to sell these ideas to the foundations that were funding you?

BS: It was different at different times. Early on, the funding was from foundations. The concept that we sold there was really the concept of clinical epidemiology, bridging between clinical medicine and epi. We were helped by the fact that my co-director, the guy who had been at Hopkins that I talked about, his mentor at Hopkins was always struck by this gap between the medical school and the School of Public Health--Wolfe Street--that I had talked about. He ultimately left Hopkins and went to the Rockefeller Foundation. Rockefeller had funded most of the schools of public health in the world, and they considered it their biggest failure, not because they weren't doing good work but because it gave the medical schools an excuse not to do it. The medical schools are where the authority was, the money was, the prestige was.

Given all of that, the concept of clinical epi, bringing the two together, was actually his; it wasn't ours. Rockefeller mostly funded international programs. He went to the Mellon Foundation and the Dana Foundation, and the three of them together funded the formation of our program. He justified it [that] Rockefeller performed enough of a critical mass to develop an international

training program. After we got bigger, we started an international training program, where we chose what we thought ultimately were the twenty-seven best medical schools in the developing world that didn't have schools of public health, committed to each one to train nine people--six clinical epidemiologists, one economist, one social scientist and one biostatistician--again, interdisciplinary--based within a medical school, also not just training individuals but committed to institutions. In turn, the best of them then became training centers, and we metastasized. There are more clinical epidemiologists now in Thailand undoubtedly than there are in the U.S. because of that dynamic. I've been involved in global health and committed to global health since the very beginning of my faculty career because of that as well. Again, it fits the idea of helping countries that need our help as part of that.

Early on, we had the foundation support, largely because of the concept of clinical epi. After that, you're not going to succeed in medicine without support from NIH [National Institutes of Health]. Early on, NIH was very skeptical of pharmacoepidemiology as a field. Most of my first grants had nothing to do with pharmacoepi, or the pharmacoepi was what I really cared about, but I was funded for something else and did it indirectly.

Ultimately, we educated people that this was a rigorous science and was worth funding. Most of the money that we got through the years, as a field as well as individually/personally, was NIH funding. Certainly, I've gotten probably hundreds of millions of dollars of funding for my own research, in addition to all the other people who we fostered and trained through the time. NIH is the trough that biomedicine lives off of, from a research point of view. Keep in mind, it's now roughly forty billion dollars a year. It's a lot of money. Even though it's very competitive, as I always said when I was at Penn, the pay line is fifteen percent; if you're not in the top fifteen percent, you don't belong here--my Yale elitism coming out in the process. [laughter]

NIH is a very capitalist system compared to most countries. You put your salary on the grants. If you don't have grants--now, at a place like Penn, you still have a salary. A place like Rutgers, obviously, you still have a salary. A place like Harvard, you didn't have the salary. If you only had half your salary in grants, you only got paid half the salary. But it's a very Darwinian approach to biomedicine, as opposed to the British Medical Research Council-type of approach, where they fund the institution.

Again, important to my mentality in coming here, people used to complain, "Oh, woe is me. We used to get eighty percent of our money from the state. Now, we only get twenty percent." My comment was, "I come from a place with zero." If we deploy our funds correctly, that twenty percent becomes available for strategic investment, which UMDNJ did none of, zero. Every penny was spent on operations. The journey I took here involved mobilizing money for strategic investment.

Now, what I didn't know before coming is I'd start in a fifty-four-million-dollar hole, because UMDNJ had that deficit which nobody knew about. It's not that they hid it from me because I even went back--I'm sitting there, "What am I, an idiot? I don't know how to read financial documents?" I went back to those financial documents even knowing that [and] couldn't find it. My CFO [chief financial officer], who's fantastic, couldn't find it. It was incredibly artfully

hidden, including hidden from Rutgers. RBHS started out in a fifty-four-million-dollar hole. Before we could move to strategic investment, we had to close those gaps as well.

Then, when we moved to RCM [Responsibility Centered Management], we were handed another hole that we needed to then close going forward. That's what we've been doing. We will close this year with a substantial positive balance, even despite COVID. This has been the journey we've gone on. All the investment in growth--I've replaced eighty percent of my deans, all my institute directors, eighty percent of my department chairs. We've been recruiting two hundred to 250 new faculty a year at RBHS, but a net gain of only twenty-five to fifty, not that many as growth but with lots of deliberate turnover. We've done that all from that strategic investment money that I mobilized. Now, we have the partnership with Barnabas, of course, and that gives us an extra billion dollars. [Editor's Note: In 2016, the Robert Wood Johnson Health System and the Saint Barnabas Health Care System merged to form RWJBarnabas Health, the largest health care system in the State of New Jersey.]

SI: That leads to my next question. What were the major challenges when you got into the job? Obviously, a fifty-four-million-dollar hole is a big one. What else was prime on your radar screen?

BS: Yes. A fifty-four-million-dollar hole was a massive one. In fact, I used to talk about--still talk about--every rock we turned over had a snake under it. The culture was problematic. We thought, as of a few years ago, we had found all the snakes. Then, it was, "Oops, we didn't tell you. This debt you're paying, that was just interest. Now your principal is coming due also." We have debt on buildings that are fifty years old. Every time UMDNJ ran into a deficit, they mortgaged a building. We have debt on a building they never built. But clearly, that deficit was a huge issue.

The culture was a huge issue because of the lack of expectations of productivity. The expectations were it was getting handed to you with eighty percent of the money coming from the state. It's leadership and needing to recruit new leadership for the institution. Morale, the faculty hadn't had a raise in six years when we walked in. The union, it's highly unusual to have a unionized faculty in biomedicine. It's not the norm, but it's certainly not that unusual in the rest of academia, but it's highly unusual [in biomedicine]. In fact, one of the first things I found when I came here was a grievance from the union because the cardiologists were being asked to be on call on the weekends. What? Do people not have heart attacks on weekends? How is that compatible with a medical world and a world where we train ungodly hours in order to be able to give appropriate care and your priority is supposed to be your patient? The union mentality--it's not the faculty, the faculty wasn't an issue--the union was representing itself, not the faculty.

Culture change was part of it. Part of the culture change was everything being chopped up. I had three different environmental health programs. I had two different nursing schools. I still have two different medical schools. Rutgers is really good at the whole being less than the sum of its parts; UMD was even better. It's the cleaning up and developing critical masses given the size and scale of the operation, building things into a collaborative critical mass. The two medical schools, the person who created UMDNJ, Stan Bergen, there was a line across the state called the "Bergen Line." Nobody north of the line was allowed to collaborate with people south

of the line. I just described to you how pharmacoepidemiology is a worldwide field. They weren't even allowed to collaborate across New Jersey. Things were just so chopped up, and the cultures in the two medical schools were different. The faculty practices were very different in the two schools. That has an enormous impact even from a ranking point of view. The biggest part of the ranking of medical schools is NIH dollars. We divide it in half--how is that rational?--significantly hurting the rankings accordingly. [Editor's Note: Stanley S. Bergen, Jr. served as the founding president of the University of Medicine and Dentistry of New Jersey (UMDNJ), holding the post from 1971 to 1998.]

The other thing is the appointments and promotion criteria rewarded a lack of productivity. It incented lack of productivity instead of incenting productivity. We had to change all of that. Fortunately, the Rutgers model was much more rational than the UMDNJ model. We essentially adopted the Rutgers model with variations to fit biomedicine, instead of adopting the UMDNJ model. But we needed to negotiate all of that with the union at the same time as the fact that they had not had a raise in six years. Certainly, learning about a unionized atmosphere was a big learning experience on my part, again, especially unionized faculty, especially biomedical faculty, physician faculty, just very, very unusual.

Other big problems? Those were probably the biggest problems. We renegotiated deals with our hospitals, at that point hospital to medical school individually, in order to correct the finances because we were basically subsidizing the hospitals. Ultimately, obviously, the megadeal with Barnabas, RBHS overall to RWJBarnabas Health overall, which, again, is very much a work in progress. We are a work in progress knitting together our different schools into one academic medical center.

Our medical schools are small for medical schools. Our faculty-to-student ratio, it's the same. It's about one-to-one, which medical schools typically--the best medical schools--have many more faculty than students. The faculty are not supported on tuition; they're supported on either clinical revenue or grant revenue, as the case may be, as the business model. It's a very different business model than in arts and sciences. Our schools are very much middle-of-the-road schools, given their small size. There are things we can't offer. There are things we can't do because they're too small because there's not enough cases of a particular kind in one city. Developing a collaboration across the two to be able to do that--again, the individual schools are small. As a whole, RBHS is a behemoth, so being able to knit it together to be able to take advantage of its size and scale.

We have two separate MD-PhD programs. How is that rational? The MD-PhD program in New Brunswick collaborates with Princeton and is good quality in the process but still not top because half our operation is in Newark and they're not part of that. It's theoretically one graduate school. Even GSBS [Graduate School of Biomedical Sciences] before the merger with New Brunswick was theoretically one graduate school. These were functionally two separate graduate schools within RBHS, one in Newark and one in New Brunswick. How does that make sense? You put in a training grant; you're only tapping half your capacity with a training grant.

Training to me was always incredibly important. I've given you a little bit of a taste of that. I was personally PI [principal investigator] of more NIH training grants than all of Rutgers had--

and certainly all of UMDNJ had as well. Without that, we lose opportunities to fund trainees and to fund the best trainees, and people offer them funding accordingly. Our graduate schools are small for the caliber of the University and for the size of the University, and that's because we don't take advantage of extramural funding. There's good reasons for that, but both schools had irrational systems set up that were counter-incentives to faculty applying to training grants. We've reversed that on our side at least, so that there'd be strong incentives to be able to get people to put in training grants, where I'm told now there had been strong incentives to not submit training grants because of the irrational administrative rules that both halves had, both legacy Rutgers and legacy UMD had.

Again, that's key to my management style is trying to rationalize incentives. I talked about the deficit I picked up. In the first years, all my money went to cover expenses, and there was still a deficit. We cleaned it up over a few years, and I developed a system for my state funding that the state funding would be distributed in four buckets. One of them, which is half the funding, was matching money. So, we matched part of the tuition. For a state school, we should be cheaper than private schools. I matched part of the indirects from grants, a fifty percent match on indirects. For every dollar a program brought in, they got all of the indirects and another fifty percent from me. Half of our funding went into that. The second bucket is other formulas we set up to foster collaboration across programs and between centers and institutes and schools, so that there weren't the silos of the schools and the institutes not working with each other. The third bucket was deficit funding, and the fourth bucket was strategic funding. I told people every year I would cut that third bucket and put that money into the fourth bucket, building more strategic funding year upon year. In the meantime, programs need to learn to live on their own, but the living on their own includes my subsidy, my matching funds. You bring in more money in tuition; I'll give you more money in matching. You bring in more money in indirects; I'll give you more matching accordingly.

That's the journey we've been on and have built strategic funding to be able to recruit faculty in the process. Creating systems, rewarding programs, rewarding faculty through the promotion systems, creating systems that reward people for doing the right thing, and then stay out of their way. Get good people, provide them the resources they need. UMDNJ used to recruit new faculty and provide no start-up funding. That's nuts. You can't do science that way. But they had no strategic funding. We use our strategic funding to do that, to start up new faculty and give them start-up funds to be able to start them up accordingly, with the expectation that they become largely self-supporting thereafter. Again, setting up logical systems and formulaic systems for the faculty.

With our new union agreement we just had, people can get personal bonuses if they put in training grants. In addition to the institutional stuff we had, we have personal incentives. People get personal incentives if you cover more of your research time, not your salary--the research time should be on grants. If you're eighty percent research, you should be supporting eighty percent of your salary. If you're twenty percent research and you're supporting twenty percent of your salary, you should be rewarded for that. It's not the percentage of salary that matters; it's the percentage of the time you're spending on research.

We built these systems into the union agreements. We built these systems into the funds that flow to the programs to basically try to correctly align expectations and rewards so that people and programs are rewarded for doing the right thing. With that, we've had a twenty percent increase in NIH funding every year on average, even before the influx of Barnabas money. It's rationalizing management and properly aligning rewards and expectations to programs and to individuals.

You asked what are some of the hardest things I've dealt with, I started with everything being the opposite of that. There was no strategic money. The only research incentives people got was if you covered thirty thousand of your salary on a grant, you got a twenty thousand bonus. Well, guess what? Everybody was on their grants for thirty thousand dollars and not a penny more, no matter how much time they spent in research. It was a completely irrational approach and no incentive to put in grants themselves. They just had to be on some grants for that much time.

It's figuring out the right rewards and the right incentives and setting that up, so they're institutionalized, and, again, staying out of people's way, in terms of I do not micromanage. I know people are shocked at the details I know about their programs [laughter], but I leave that to the leaders until they screw up and then I let them know. I have no problem replacing people, again, if they're not doing a good job. In fact, when the University Senate wanted us to do dean's reviews as stewardship reviews, which is what UMDNJ used to do, my answer is, "No, I review programs," which, parenthetically, Rutgers stopped doing because of its size, reviewing only programs that were in trouble. I review all my programs every five or six years going forward, but that's not reviewing the leader. Obviously, it reflects on the leader, but if I want to get rid of a leader, I'm going to get rid of the leader; I'm not going to wait for a review. I don't need to wait to be told to get rid of the person.

I've recruited fantastic people. We've gotten and continue to get--it keeps getting even better in terms of the phenomenal leaders we get from elsewhere. I've got this slide with logos that are getting smaller and smaller of all the people we've stolen from elsewhere, and those are just the people I personally have recruited. Part of what I say to the people I recruit is, "If you want a maintenance job, don't come here. This is a build." But the right leaders, who are entrepreneurs, who want to build excellence, love the idea. Places like Penn can't pull that off because they're holding on to what they have by their fingernails. Rutgers is a unique opportunity and has enormous unique plasticity--I think that's a medical word, but I think it's self-explanatory--in terms of the ability to change, union and governance notwithstanding.

That's the other [question]; who actually governs the University? Is it the Senate? Is it the faculty council? Is it the union? Of course, a lot of the same people are involved in all of them. The administrative clarity is one of Jonathan's [Holloway] themes, which makes a lot of sense in terms of the strategic clarity, but part of that is administrative clarity, in terms of cleaning up the governance structure of the University.

SI: I was curious how you worked with Dr. Barchi. One of his major mandates coming into his job was to integrate the system, and then your work begins. Did he put his ideas on you, or did he just set you up and let you run? How did that work?

BS: Mostly the latter. Let me preface. Firstly, Bob and I have known each other for years. We were both chairs, we became department chairs at Penn at the same time, both chosen by the same person, Bill Kelley. I learned an enormous amount about management from Bill Kelley. He's the one who built the Penn medical school into what it is. Before that, he had built the University of Michigan into what it was when he was there beforehand. He has his own style of management. It doesn't mean I do everything Bill did. I learned both good and bad things but mostly good things.

Bob and I are very clear, we both consider ourselves products of Bill Kelley. He and I are dramatic opposites though in management style and personality. I love to build. That's not what Bob has always done. But we both learned that you don't micromanage. One of the things Bill did is you get good people, you give them the resources they need, and you stay out of their way. Bob micromanaged the administrative infrastructure of the University, which needed to be totally changed. So, the entire SLT [senior leadership team] and administrative infrastructure, from the IT infrastructure to the accounting infrastructure to everything else, needed to be changed. That he micromanaged, and the University needed it. He was the perfect person for that and was really good at it. From an academic point of view, he always wanted to be informed, but he stayed out of the way.

We met every week, if I remember right. Eventually, it became every two weeks, but mostly, it was every week, except in August when he was up in Maine. In the beginning, we still met every week by telephone when he was in Maine to keep him abreast of what was happening. But he was not a dictator. Again, Bob is very smart and very insightful and knows medicine very well. He was certainly somebody to run ideas by who would have good insights.

I think he was exactly what Rutgers needed at the time. Jonathan is very different, but I think he's exactly what Rutgers needs now. Yet they're very, very different from each other, which a healthy institution--not just a university--will do exactly that. You go for a leader with what you need at the time, which might be very different than what you needed before.

Bob needed to build some professionalism and infrastructure into the University that it didn't have before. He broke some eggs along the way [laughter], but it's what the University needed. Working with Bob, again, we're very different people. Kelley prided himself on recruiting chairs, most of whom were nice people. No one would ever accuse Kelley of being a nice person. [laughter] A key in a leader is knowing what you don't know and [hiring] people who are complimentary to you and not feeling threatened by that. Bob was that way. He also was a basic scientist, where I was a population scientist. Even from a scientific point of view, we were complementary.

SI: Again, this is my perspective from being very outside this world, but it seems like a lot of the issues that you were dealing with when you first came here--the siloing, the chopping up of the resources--stem from a problem Rutgers has had for a while with having to deal with the legislature, what areas get prioritized, so many dollars have to go here, so many dollars have to go there. First, is that the case? Two, how do you deal with the legislature, the public, those kinds of pressures?

BS: I actually don't think that's the case, that that's why, at least on our side. I think Rutgers, in general, has siloing because it grew by accretion rather than organically. So, there's all the different schools and colleges that each have their own identities and cultures that got absorbed with it. UMDNJ though wasn't that way. It didn't grow by accretion. UMDNJ was a culture set up by Stan Bergen to have an atomized program. As I understand--and I never met him in person, I did talk to him once on the phone before he died--he was an extraordinarily strong, extraordinarily effective leader, who led it for many years but created a system of all the programs were weak so only he could have the power. It was completely decentralized by design. This issue of having two med schools, which is nuts--what university has two medical schools?--that wasn't by accretion. It was set up that way to make sure that nobody could rival him. The subsequent leaders of UMDNJ weren't nearly as strong or as effective as he was, and the institution suffered from that, given its structure. That's really where that came from, on the UMD side. It wasn't legislative interference.

Where legislative interference was very much an issue was the legislature interfered with UMD a lot, much more than it did with Rutgers. The Rutgers odd governance of two boards actually helps enormously in protecting us from legislative interference. When I look at, for example, University Hospital, where I'm on their board and look at how involved the government is in that, it is much more involved there than it is at Rutgers. Rutgers is much closer to a private university in its ability to act. The one thing Bob focused on, he said, "If you were at a private university and had a donor that gave you twenty percent of your money, you'd pay attention to him," and Rutgers typically didn't. Bob tried to develop a better relationship with the government and I think mostly did. Rutgers was seen as a resource by Trenton, which it was not earlier on. Does the legislature interfere? Again, much less. Certainly not zero. Do I interact with legislators? Yes. Again, we have a very effective government affairs office, though, led by Peter McDonough. Pete parades us out at the right time to be able to look for initiatives.

Certainly, when it came to the COVID stuff, I was interacting with the governor's office all the time, whether it was the implementation or the deployment of the Rutgers saliva test, whether it was providing care, whether from a financial point of view--they cut all of Rutgers' funding those last three months initially. Ultimately, they gave it back after the fact. But in conversations with the governor's office, "Do you really want to cut us in the middle of the pandemic when we're providing the care that's saving people's lives?" They restored us long before they restored, in retrospect, the rest of the University. So, I had a lot of interaction with the governor's office there. I certainly have interaction vis-à-vis University Hospital as well, interaction in terms of initiatives. We've established this new center for COVID and other pandemic diseases that we're hoping to get funded long term. We got funded for the gun violence center. There are a lot of things where we're looking to the state for opportunities that help us and help them accordingly. [Editor's Note: The centers being referred to above are the Center for COVID-19 Response and Pandemic Preparedness (CCRP2) and the New Jersey Gun Violence Research Center (GVRC), which is jointly led by the Rutgers Schools of Public Health and Criminal Justice.]

The state certainly got very nervous about our partnership with Barnabas, and we had a lot of interaction with both the legislature and the governor's office about that, that this wasn't intended to squash University Hospital (UH) and we weren't going to be taking things out of Newark to

move to New Brunswick in the process. Our obligations to UH in Newark are in law, but we are committed beyond that. We needed to convince them of that, even to the degree of showing them contract language that showed that UH was protected because it was carved out, that we certainly wanted in no way to hurt either Newark or UH. But people needed reassurance about that. As we move to grow the medical schools toward each other, there's that same anxiety, an anxiety of, "Is that going to be New Brunswick pulling resources out of Newark?" No, that's not the goal in the slightest, but we need to reassure people of that.

The downside is during the COVID year and a half, we didn't have time for any of that stuff. During the peak of the pandemic last spring, for example, I was having deans and directors meetings literally every night at eight o'clock at night by telephone call obviously to coordinate our response. Whether the response was from a clinical response or a scientific response to otherwise, we clearly became a local leader saving lives and a national/international leader scientifically. It was wonderful to see what I had had the opportunity to build come together that way, to really make the kind of contributions we were able to make. Certainly, we have a lot of interaction with the legislature and the government, yes, but mostly it's been pleasant and has been constructive on both sides. There hasn't been the kind of interference that UMDNJ used to have.

SI: Is there any part of the picture that we're missing at this point, something that you think we should know that our questions haven't drawn out?

BS: Yes. I think a key issue we haven't talked about is interprofessional stuff. Again, it fits me, obviously, as you've heard. But one of our big foci, one focus, has been interprofessional. My strategic plan focused on--these are different professions. Each of the schools had their own strategic plan, their own obligations, their own profession, as they absolutely should. My focus was on integrating across them and what could be done across them. We built the first faculty practice plan that was interprofessional, not just physicians, in the country as far as we know. We have focused a lot on knitting together the different professions and respecting the different professions accordingly, trying to get privileges for the other professions to operate at the top of their license.

Part of what I've said in multiple fora is Penn has the perfectly shaped healthcare system for the year 2000. Rutgers is in a much better position for 2020 because all of the different professions are under one roof, and we have the ability to integrate across them. We need more nurses. We produce them. We need more physicians assistants. We produce them. We have the ability, as you move to population health, where the goal is to keep people healthy.

Much of what I did as a general internist, you did not need a physician's training to do. Why did we do it as a physician? Because we could bill for it. You couldn't bill for the nurses and the physicians' assistants and so on. As you move to population health, where you're taking care of a population and keeping a population healthy, it makes much more sense to have the nurses do what they can do, and you know what? They'll do it better and cheaper, both, and design a system which is rational as a healthcare system, instead of the physician-dominated system that we have in the U.S.

The U.S. system, which was driven by Blue Cross, which was controlled by surgeons, you pay to do. Well, when you pay to do, you do more, and the net impact is we have too many procedures done. Costs have skyrocketed. We pay surgeons a lot more than primary care docs, who are paid more than nurses. You do procedures, you do MRIs [magnetic resonance imaging], you do technology because you get paid for it. With that, healthcare is approaching twenty percent of the gross national product and bankrupting the country. That's not sustainable. So, we're moving as a country toward a population health, where you basically get paid per person per month, and that risk then goes back to the healthcare providers. But now you have an incentive to provide too little care. You shift from a model where the incentive is to provide too much care to a model where the incentive is to provide too little care.

You need a huge data infrastructure. A, you need a huge operation, so one transplant patient doesn't bankrupt you, which is why you're seeing the practices come together and hospitals come together and so on. You need a huge data infrastructure to make sure people are doing what they should be doing. Are they measuring blood pressure? Is the blood pressure under control? Are they measuring cholesterol? Is it under control? Are people getting the care they're supposed to? You need a huge data infrastructure to be able to do that. We're in the process now, in partnership with Barnabas, they're putting in an electronic medical record--of course, them and us both--at the cost of a billion dollars. We couldn't do that by ourselves as an academic center. The old approach to solo practitioners, which New Jersey was still doing when I arrived, is not a sustainable model. Moving to population health we are really well positioned for, and our partnership at Barnabas helps that in providing us scale and financial underpinnings. But our knitting together all of RBHS is key to that as well, interprofessional and a kind of scale that you can pull that off that you can't otherwise.

SI: Is there anything else you'd like to add for this session?

BS: Again, my focus on excellence and top people, we've talked about it. That's all built into promotion systems, reward systems. That's been something I have focused on my entire career and building on excellence. It's harder in medicine because, in principle--not that Rutgers has done this--but in principle, you could say, "Our philosophy department is fantastic. To maintain that, we're going to get rid of this department that no students want." You can't get rid of a cardiology department or a pulmonary department. In healthcare, you need to provide the whole gamut. So, they don't all need to be top academically research-wise, but you need to provide the full panoply of services in order to meet patients' needs.

PC: I just had a background question for an academic. Is there a place that I could go to read some of the background I'd need to understand more of the technical stuff you told us today about what you've guided Rutgers through over the time you've been here? Are the strategic plans the sorts of things that would give me a feel?

BS: Yes. A few suggestions. One is we have our strategic plan from five years ago, from when I started. We're updating and redeveloping that now. But that's there, and that's on the web. Also, we've done a lot of work with Brent Ruben, the Rutgers Leadership Academy. He's been an enormous help to us through the years. He published a paper studying us and his experience working with us through the years. Then, the Nicholson Foundation also funded people in the

Business School to write us up as a case study, what we've been through. Steve Andreassen, my chief of staff, could give you …

PC: Who is your chief of staff?

BS: Steve Andreassen.

PC: Okay, got it. Thank you.

BS: Actually, there's another key piece I guess we haven't talked about much, just to quickly go through, which is community stuff. I foreshadowed that a little bit in terms of my experiences in the past. At Penn, Bill Kelley, who I talked about, used to talk about the local community as a place he needs to close his eyes as he gets driven through. Again, it was a ghetto, like the Hopkins experience, like a lot of medical schools are in the middle of the worst part of town. Philadelphia wasn't the worst, but it was the second worst. He used to say to me, "Brian, you can do anything you want in the community as long as you don't bring those patients here," because they don't pay as well.

My nature has been, both in terms of my sense from Yale of being committed to wanting to help people and in terms of epidemiology, by its definition, the population. It's the study of diseases in populations, dealing with the community. It is something which I've been very committed to. It's something historically UMDNJ and Rutgers have been enormously committed to, which is fantastic. The idea of being in a position to be able to help the State of New Jersey and upgrade health throughout the state has been something that has been of enormous interest and importance and something that we have been very good at through the years. Population health is the extension of that, because as we move to population health, suddenly we're going to be paid for it, which we haven't been in the past. We've been paid to do, not to think. We've been paid to sit in your ivory tower and wait for people to get sick. You come to treat them and then send them back so they can get sick again and then come back again. That's the traditional academic approach to medical care, as opposed to outreach, working to keep people healthy.

In fact, we have a search underway now for a Vice Chancellor for Population Health. We built the scientific base for it now, the Institute for Health, Health Care Policy and Aging [Research]; the person who leads it is the Henry Rutgers Chair of Population Health Research. We have a School of Public Health that has been enormously built up. We've built up a lot of that infrastructure. The health system understands the world is changing. This new vice chancellor will bridge between us, in terms of bringing our academic capacity and ideas and creativity and innovation into the health system to implement. The health system starts as a hospital system only; it's a confederation of independent hospitals that is slowly being knitted together as we slowly knit together RBHS, and now we're partners together. The focus on community as a fourth mission--traditional academic missions are education, research, and clinical--the focus on community as a fourth mission is something that Rutgers has really been a leader in.

SI: All right. We're at about two hours. We appreciate all your time today. It's been very informative. I don't know that we'll do a third session now, but maybe in a couple of years, we'll

come back and I'm sure you'll have a lot to talk about then. We'll get to the end of the COVID story.

BS: [laughter] The COVID story is mostly over now. It's never going to go away, but I think we've seen our last surge. From now on, we coexist with it.

SI: Thank you very much.

BS: My pleasure.

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

Reviewed by Isabella Kolic 7/22/2021
Reviewed by Molly Graham 9/17/2021
Reviewed by Kathryn Tracy Rizzi 12/8/2021
Reviewed by Brian Strom 1/30/2022