Dr. Nora Volkow

Behind the Mask

October 14, 2020

Barr: Good morning. I'm Gabrielle Barr from the Office of NIH History and Stetten Museum. Today is October 14, 2020 and I have the pleasure of talking to Dr. Nora Volkow. She is the Director of the National Institute on Drug Abuse. Thank you very much for being with us.

Volkow: Thanks very much for having me.

Barr: It's nice seeing you in front of me. So, the National Institute on Drug Abuse (NIDA)is taking part in a number of COVID-19 related studies as well as overseeing a number of extramural research projects dealing with COVID-19. Can you talk a little bit about some of these initiatives and your role in them?

Volkow: The pandemic has affected everyone, and all of the diseases and all of the institutes are very much now addressing challenges that are posed by it. In our case, COVID-19 arrived when we were amidst the worst epidemic of addiction that we've ever lived with in our country which was causing the death of a very large number of people from opioid overdoses. We haven't been able to control this epidemic, which is changing very rapidly, and which was initially initiated with taking drugs for pain, then for heroin, then for fentanyl, and then we're observing it for methamphetamine.

I missed this crisis. We were hit like everybody else with a pandemic and from that research perspective it became clear that we needed to move very rapidly to try to, first of all, understand how the pandemic was affecting people with substance use disorder and also how it was affecting the vulnerability of people who start to experiment with drugs. Also, how it was affecting particularly young people, who are the most vulnerable, and how we could, based on that knowledge, apply it to minimize the harmful effects while also recognizing that there were other moving parts in the substance abuse field such as the expanded legalization of marijuana across the country, the expanded utilization of electronic cigarettes and exposure to nicotine and addiction to nicotine, alongside the negative medical consequences from vaping.

All of these collided and this certainly raised the urgency of what we needed to do in a period where, of course, things were going much slower than we were used to. Many research teams had to stop operations due to social distancing, due to lack of access to healthcare facilities, due to the lack of access to justice settings which were closing their doors to anyone outside entering their facilities. All of these basically required massive coordination and centering of efforts. The first thing that we did was rapidly release a Request for Use Supplements for the researchers to actually be able to understand what was going on and apply interventions. So, as a result of that in this past five or six months, we've been able to award 80 supplements that go from research that is relevant to clinical trials, that is relevant to implementation science, that is relevant to service research, [and] that also had to address,

by the nature of what we're observing, the health disparities that are just affecting everyone and certainly we're seeing that also in individuals with substance use disorders. So that was one element.

The other element was that we needed also to rapidly adapt as we had gotten from Congress, through the funded money, a significant increase of resources to actually deploy toward understanding how to address the needs of people with an opioid use disorder so we could prevent overdoses and fatalities. We've launched, coordinated through Francis Collins' leadership, multiple projects, some of them very, very ambitious, to implement evidence-based interventions that are integrated across states that are decimated by the opioid crisis, to expand our portfolio for medication development of new, more targeted treatments for opioid addiction and overdose reversal, and to target interventions towards prevention to sort of ensure that people don't become exposed to opiates and, if they do get exposed, don't become addicted.

So how did we accommodate for all of these challenges of these projects? Finally, a very important [point] is that, I think, is something that we cannot in any way deny or keep our eyes on, is we've all been stressed and basically in isolation.

We know of high risk for substance use and we are seeing that more people are drinking alcohol, more people are taking marijuana, more people are dying from overdoses, but how is it affecting the younger generations? I mean in that transition that you go from childhood into adolescence into young adulthood, your brain is developing at much greater speed than anything that will happen to us as adults. So, the environment that surrounds us is going to be fundamental in determining how ultimately this [the brain] forms. We're seeing it through social isolation, when adolescents, who were very much social creatures, as adolescents when it's crucial their peers are part of who they are.

All of a sudden, all is virtual. How is that affecting their brains? How, in terms of their emotions, they are learning through virtual environments? If they do get infected, how does it affect the brain? One of the aspects that we've learned from past epidemics, like the Spanish flu, or certainly without an epidemic, but to a certain extent, was the Zika virus. We do know from these past experiences that viruses can get into the brain and modify it and increase the likelihood of neurological and psychiatric diseases. Through the Spanish Flu we know, for example, a higher emergence of cases of Parkinson's disease among adults and among adolescents and children that got infected. There were reports of increased hyperactivity hyperkinesis that was done. The latter got identified as part of what we call Attention Deficit Hyperactivity Disorder.

In the case of COVID-19, the evidence of whether the virus goes inside of the brain is not clear cut but there's evidence that it does have neurological consequences and psychiatric consequences. Whether it is from inflammatory responses to the massive cytokine storm, whether it is from actually the virus itself affecting nerve cells in the periphery that then result in the neurological symptoms, or whether it is from the massive stress that we are all affected by currently. So, we rapidly launched supplementation of our large projects on brain imaging of adolescents, the ABCD, so we've supplemented them so that they can understand how those teenagers—well, they are nine- to ten-year old children, now 11 or 12 year old—are transitioning into adolescence. We are taking advantage of that story to understand how it's affecting them, and we will be having their brains scanned as soon as these imaging centers open their doors to see those that are infected, how it affected them.

Similarly, in parallel with the other study that we had piloted is the study on imaging starting in infancy. We've also done multiple supplements so that they can understand whether the women that may be pregnant get infected. How is that going to affect the brains of the newborn? Also, for those newborns that are being followed up for imaging or behavioral assessments so that we understand how COVID-19 is affecting them. So, all of these we have to do very rapidly.

We also have to do the research on policy. There's been significant changes on the way that we practice medicine through telehealth in the field of opioid use disorder. We have for the first time allowed patients to take methadone home for those who have not been stable for two years. This is the current practice which will make it more accessible. We have made it possible and it has been embraced—the use of medications in jails and prisons, the access to buprenorphine without having to physically see a doctor, expanding the use of this medication.

So, all these new ways of providing treatment have expanded access and in many instances have been lifesaving. In others, it has been challenging because not every patient responds to virtual technologies, but we need to know and to understand who responds, who doesn't respond, and how to optimize it. This is just a massive amount of work that we've been involved with at multiple levels at NIDA. This involvement obviously has been challenging because we are not seeing one another. Using virtual technologies has facilitated the speed at which we can bring expert assistance and has facilitated for all of us to be constantly up to date on what's going on. It provides us a view into the world in multiple screens that allows you to really be monitoring where things are at the expense of the obvious lack of contact. I mean, certainly for me, it has been hard and I'm very aware of it. It's not an easy thing to not see the people you like. I'm someone that comes from Mexico. We're very physical creatures. We embrace, we kiss each other, and that is gone. It's a hard part.

Barr: What was it like to have to transition so fast? I mean that must have been really hard. How quickly did you have things in order?

Volkow: Well, everybody realized the urgency of the situation. At the same time, we have very clearly understood that we have a very important mission. In many ways, it's obviously our responsibility, but it's also a privilege, to have that opportunity to be able to integrate your actions into something that can help others. I always view that as an extraordinary privilege. I know my team, which is really remarkable, takes it very seriously. So, people's lives are importantly at stake and we cannot be Mickey-mousing around; we have to do everything we can to do the best job that we are able to do.

Barr: Yes, definitely. I thought it was really interesting that already funded research has paved the way for some COVID-19 research. Can you tell us more about how addiction science has leveraged the fight against COVID-19?

Volkow: The one that comes to mind is that we've been very interested in tracking the epidemic of drugs in our country. It's very important because we actually need to know where there may be an

emergence of a new drug and what characteristics that takes so that interventions can be actually deployed there.

One of the technologies that NIDA has actually funded for many years is the notion of being able to monitor the exposure to drugs through the sewage system. In the past that has not worked very well because the technologies didn't have the sensitivity to actually detect the concentration of drugs in the sewage system unless there were very high quantities of sewage to evaluate whether the presence of drugs was there or not. Analytical tools and methodologies have advanced so rapidly that now it is possible with very high sensitivity to detect the presence of drugs. So, if I want to know if fentanyl, in particular, is available in the sewage system of a community—is it fentanyl, is it methamphetamine, what drugs are actually being deployed or used in communities—with high temporal resolution and we have sensitivity.

Now we can actually measure quantities that are in areas that are relatively small. We act very fast, in 24-48 hours temporal sensitivity, so that technology immediately intrigues [us] about the possibility of actually applying it for the use of determining whether in a particular community what was the level of COVID-19 without having to necessarily go to each individual, but by looking at the sewage. This is very rapid treatment which directs my attention. Elena Koustova, who directs our translational program at NIDA, basically brought to my attention that you were shedding through the gastrointestinal tract COVID-19 viruses that were surviving. That was, of course, therefore an incredible opportunity to apply the same technologies and that is how we got very much involved in how we could ultimately utilize these tools that are not just measuring drugs but can measure viruses at very high sensitivity. You don't need huge concentration and that is extremely interesting. It allows us to get a perspective that is different from the one that we're getting by individual testing and to assess its fluctuations.

I was very interested to deploy a project where we could be monitoring both in communities with very high content of fentanyl, how was COVID-19 basically present, how it was influencing? Unfortunately, we were not able to deploy that particular project sufficiently on time, but, on the other hand, there is in parallel the use of these for just in general throughout the whole United States for populations.

Barr: It's really interesting. I would imagine there might be a high correlation of opioid use in COVID-19.

Volkow: The thing is that COVID-19 is affecting the whole United States and you can see how it has been advancing. It's not really that any particular area has been more protected than others. At one point actually, for example, the center of the opioid epidemic basically started in two areas, one of them is the Appalachian region and the other one was New Mexico. At the inception of the epidemic we have a very low number of cases in West Virginia and in New Mexico. Of course, all of that changed, so it's not per se uniquely that it will be where these drugs are available that people are going to be more likely to have been exposed to COVID-19. It is more the situation that if you have a problem with a substance use disorder, whether it is opiates, cocaine, or methamphetamine, you are much more likely to be in situations that will expose you to get infected. But depending on the prevalence of individuals with opioid use disorders who also are disadvantaged. If you have an opioid use disorder but you have the resources and the infrastructure to get proper treatment and care, that does not necessarily expose you

to greater risk. But if you don't have that…. Which is the case, I would say, for a very significant portion of individuals with substance use disorder, putting them at risk.

It is putting them at risk. Just looking at the electronic health records we have been able to show that individuals that have a substance use disorder are much more likely to get infected. Then, if they do get infected with COVID-19, they have worse outcomes. It is not per se, I think, that we get the disease, as the data have clearly shown that no one is immune to COVID-19 per se unless, of course, you have the antibodies, but that's just a fragment of our population. We need to practice everything we can to minimize exposures from that research perspective. What is it that we can do to protect individuals with substance use disorder from COVID-19? What are the unique challenges and how do we basically deploy them?

Barr: Well, have there been any intersections between COVID-19 and drug abuse that you didn't imagine from the start that you would want to see further explored now?

Volkow: Oh my God! I never imagined COVID-19! I think that certainly we need to understand ultimately how, for example, the COVID-19 pandemic is affecting the distribution of drugs, illicit drugs, in our country. It's actually not very clear because data information has been jeopardized; [there's been less] access to information by a lot of the restrictions that exist with a pandemic. On the one hand, for example, initially I was sort of optimistic as I said, "Maybe by the closure of the Chinese borders will make it difficult for fentanyl, a lot of which comes from China—or methamphetamine—will make it harder to bring into the country, and the same thing in terms of closing of other borders.

But what we have learned actually—and again a lot of this is anecdotal because we don't have hardcore data overall—there has been a shift in the drugs that have become available, so more synthetic drugs that are easier to manufacture in place, like methamphetamine, actually as is fentanyl, are becoming more widespread. There are actually reports, I mean, that fentanyl, which initially was started very much in the northeast part of the country, now is available all over the United States including the west states. Similarly, methamphetamine, which was very much a West Coast type of drug now has moved itself into all parts of the United States including the Northeastern parts. So, people are taking the drugs that become available and the market is adapting to the situation.

This, in many instances, has resulted in exposure to more potent and toxic drugs and drug combinations which also are more lethal. I wouldn't per se have imagined it, but I wouldn't have imagined other things that, as I say, is also the tragedy of what's happening to people as they are losing their jobs. And, with substance use disorder, people are stigmatized and discriminated [against] and fear going to seek healthcare if you are sick because you are afraid that you will be discriminated against when there are not enough patient beds. Will they favor those that are not addicted\, as has been the case for many treatments like hepatitis C or antiretrovirals for HIV? People that have substance use disorders are not at the top of the list of who's going to be treated and that stigma is a real negative or, of course, horrifically negative for the person that's suffering from the disease. It affects us all because, if we don't address their needs, we cannot address COVID-19. I mean we need to treat them. We need to actually

provide them support and that will in turn prevent their infecting other people. We're all in this together.

An infection like this comes along and makes us realize how our actions are not just going to be influencing us, but they influence everyone. How we behave can actually increase the likelihood of someone getting or not getting infected. Life is at risk at this point. We don't actually understand long-term consequences from these infections. You get infected; you get over it. As we're reading in the scientific literature, there's more evidence than in some cases there are long-lasting negative effects to your cardiac or your pulmonary health, to your neurological symptoms that are long-lasting. These are issues that I would not have imagined, and I wouldn't have imagined. Though I probably could have sort of predicted how devastating it has been for underrepresented communities. I mean African-Americans and Hispanics. The mortality rate in these groups is really appalling and makes us reconsider that we cannot keep on doing things the way that we did. We need to address this.

Barr: Yes, definitely. As the director of an institute, what has it been like to lead your many employees and staff and fellows at this time?

Volkow: To me it has been a privilege. I realized that I actually value the ability to have people that are so talented, so committed, and that I'm basically sort of a director in an agency with such incredible people. I find it very rewarding to oversee the young scientists in a very important way. One of the most important tasks that we have when we are directors of institutes is to ensure that we are training a new generation of scientists. Scientists are one of the most powerful tools that we have to overcome challenges like the one that we are living. We need to provide them with training and mentorship. That is one of our most important tasks at the institute and one that is very pleasurable and reinforcing to see the excitement and enthusiasm of the new generation, their hunger, their wanting to actually do something and actually apply science and understand the world in better ways and provide new solutions. It's been a privilege. I am someone that is missing the physical interaction. It has been hard but the opportunity, on the other hand, to lead these very difficult times has also been very, very reinforcing.

Barr: You've spoken a little about one of your personal challenges as well as opportunities at this time.

Volkow: I really truly miss people and it's a hard one. I'm sure that a lot of people are struggling with this and so the issue is recognizing that I'm not dwelling on that as an emotional negative, sort of nostalgia or sort of missing someone, but instead figuring out how to deploy that emotion and trying to value viewing others. When I see a face, I smile. It makes me happy. It's not actually realizing that we need to learn to understand that there are many other things that we are enjoying. I think that in terms for me that the COVID-19 pandemic has made me aware about things that I had stopped looking at or viewing or feeling pleasure for because they were just automatically there. So, I find myself truly enjoying hearing the birds in my backyard. I didn't' realize there were so many birds in this backyard and I'm

smiling when I hear them with all of these crisp and sharp tweets or they fly. The enjoyment of our present environment, I guess, I have taken it for granted. I didn't recognize how important it was. Do I think it has been for me a lesson that the isolation has given me the opportunity to enjoy my surroundings in a way that I had stopped doing?

Barr: That's definitely very nice. Have you done any COVID-19 cleaning? It sounds like you've spent a lot of time at home. What has been the most interesting item that you have found?

Volkow: By COVID-19 cleaning? I would say, "No, I am not the person that enjoys cleaning; I do not." The most interesting thing that I found is that I love all the animals that are surrounding me, the squirrels, the birds, and realizing that obviously we're not alone. That for me has been the most exciting thing that COVID-19 has brought. Also seeing my neighbors, I mean going out for walks and seeing them and really seeing them and also the recognition of how I'm reacting to them. It makes me happy for all the ducks they are bringing to the area. All of that life that goes outside of ourselves that sort of resonates, I guess, with much greater intensity than I have seen in the past. That has been the greatest surprise.

Barr: Do you have any advice to people as an NIH scientist but also as a person who is living through this pandemic?

Volkow: The advice that I would give is the advice that I give to myself: that the pandemic has made us very much aware about how strong are the connections with one another, and that can bring a lot of pleasure. It can help overcome that isolation. I'm not just saying it with words. The reality is that our brains are basically constructed in such a way that if you are happy and I see you smile, my own neurons are activated and I feel happiness. If you have pain, if you burn yourself, and I see your face and the pain, the areas in my brain that are processing pain get activated, so when I say I feel for you, we all have the capacity to experience the emotion of the other. I think that that's an extraordinary richness. It's also, of course, extremely powerful in creating these connections with one another. It's also what can help us drive empathy and generosity and caring for each other. We reach our capacity, so it's not just our own brains but all of those brains and people that are around us that give us a glimpse into a much more complex world than the one that would be given by our own experiences. That's what we should all view as a privilege and, in a way, the pandemic has made us so much more sensitive about this. I think it's a great gift, despite all of the obviously horrible tragedy and challenges that we're living. We also have that gift of one another and our world which is quite beautiful.

Barr: Well, thank you very much for sharing your experiences. I wish you the best with your endeavors as well as with NIDA and this research going on.

Volkow: Thank you very much. Thanks for having me and have a nice day.

Barr: You, too.