Suzanne Vernon, Ph.D.

March 3, 2023

Barr: Good afternoon. Today is March 3, 2023. My name is Gabrielle Barr, and I'm the archivist at the Office of NIH History and Stetten Museum. Today I have the pleasure of speaking with Dr. Suzanne Vernon. Dr. Vernon is the research director at the Bateman Horne Center, and she's also done a lot with the RECOVER [Researching COVID to Enhance Recovery] Initiative at NIH. Thank you very much for being with me.

Vernon: Thank you for having me.

Barr: Will you please share how your medical and scientific training and years of studying myalgic encephalomyelitis, or chronic fatigue syndrome, prepared you for examining the mysteries of long COVID?

Vernon: I got interested in chronic fatigue syndrome or ME/CFS [myalgic encephalomyelitis/chronic fatigue syndrome], as we now call it, when I was at the Centers for Disease Control and Prevention (CDC). I started at the CDC in the early 1990s as a postdoc. The opportunity presented itself to participate in a biomarker discovery program within the branch I was at to discover markers of a disease that was then called chronic fatigue syndrome. It resulted from an outbreak that occurred in Reno, Nevada—Incline Village, Nevada actually. This was an outbreak investigation of a fatiguing illness that appeared to be some kind of post-viral illness. That's how I started in this field. I must say I got hooked. It was incredibly fascinating to be at the CDC and be a molecular biologist who got to go into the field to work with patients and people affected by certain outbreaks, take samples, bring those samples back to the lab, and then look for antibody patterns or novel pathogens that would be involved. At that time, ME/CFS research was a blank slate and an opportunity for discovery and really helping people. That's what I started in the 1990s and I've been pursuing this ever since. Everything that I learned back at the CDC has been built upon with every collaboration and with every research study. While there's part of me that would love to be able to study one particular virus or one particular molecule for my whole career, this is a very big and complex area that doesn't have very many people involved. There's a lot of work to be done. The more we talk, the more you'll understand how what I've been doing with ME/CFS is translating to how we can research and learn from ME/CFS and apply it to long COVID.

Barr: Yeah, definitely. When did you join the Commonalities with Other Disorders and Post-viral Syndromes task force of the RECOVER Initiative?

Vernon: That's one of the task forces in the pathophysiology component of the overall RECOVER Initiative. There was a recognition very early on by RECOVER [of the need] to have experts in place that would help understand and form the overall RECOVER study design. I was nominated for that task force back in 2021 and got on the task force in 2022. We had our first meeting in early 2022, so that's been going on for about a year now.

Barr: How long will you sit on the task force? Is it rotating or will you be on for a very long time?

Vernon: They do rotate. I am a permanent member. I guess permanent as long as RECOVER is there. They do have rotating members, and we bring in experts as needed that join the committee and ad hoc members, etc.

Barr: Will you discuss the backgrounds and expertise of your colleagues that are part of the task force? What are some of their disease specialties? You come in with a lot of chronic fatigue syndrome expertise, but I'm sure others come with their own areas of knowledge.

Vernon: The task force is multidisciplinary. Our chair, David Systrom, is a pulmonary and critical care medical specialist. The co-chair, Zach Porterfield from University of Kentucky, is a physician scientist, so he's an M.D.-Ph.D. with an emphasis in virology and infectious disease. Then we have rehab medicine people; rheumatology, neurology, and infectious disease specialists; pediatricians; and Ph.D. scientists like me. It's very multidisciplinary, which is fun.

Barr: Will you discuss some of the key objectives and responsibilities of the task force and what your role has been?

Vernon: Actually, I want to add one of the most important groups. It's the people and patients with lived experiences of ME/CFS and long COVID that are on the task force. They bring the patient perspective, which is super important. We all contribute our expertise and perspectives to the task force. Originally, this task force was formed to help inform the RECOVER Initiative about the overlap with other diseases and viruses that could help inform us about what's going on with COVID and post-COVID. That was the starting point for the task force. There was probably about 25 of us on this task force. We divided into several subcommittees that had four or five people per subcommittee. We realized pretty quickly that there was a lot of redundancy in these various task forces, and it wasn't very efficient, so we condensed the number of subcommittees, and focused on diagnostics. The task force used to meet every other week and now we meet monthly. We discuss the issues that are raised from the subcommittees and just general issues. Right now, we are focusing on modifying or amending the overall RECOVER Initiative to include questionnaires and assessments that will improve the RECOVER study and capture information that not only our task force, but other task forces believe are important to be able to capture in RECOVER.

Barr: What have been some of the other areas of discussion for the group and some of the different opinions that have been expressed?

Vernon: For the Commonalities task force, we came in with a broad objective and directive to think about other viruses that could do the same thing that the SARS-CoV-2 virus was doing. We reframed that to focus on ME/CFS. Can we think of ME/CFS and learn from what we've already done with ME/CFS to help inform the RECOVER Initiative? There's an emphasis on the questionnaires that we've used in ME/CFS that helped inform us about the symptoms of ME/CFS. How can they be implemented in the RECOVER study? Same thing with assessments—how can we assess physical function? How can we assess orthostatic intolerance? How can we

assess cognition? What do we know from ME/CFS? How's it done there? How can it be implemented in the RECOVER Initiatives? That's where we're at right now.

Barr: Can you talk a little bit about the use of digital tools? You use people's personal phones and iPads to record some of their biologic information, which is really wonderful if people are all over the country and can't always get to a medical center.

Vernon: I'm not familiar with the wearables that are being used in RECOVER in the tier one assessments. We do use various apps like a cognition app called DANA Brain Vital and wearable devices in order to be able to assess time in upright position or posture in our ME/CFS research at the Bateman Horne Center. Wearables are a great way to passively collect objective data 24/7, if need be. That's what your Fitbit and things like the Oura Ring do. Apps, like the DANA Brain Vital app, assesses cognition and brain health from the comfort of your home.

Barr: What have been some of the challenges that this task force has encountered?

Vernon: One of the challenges some task force members did not have ME/CFS knowledge or expertise. So there was a bit of a learning curve to get task force members up to speed on ME/CFS. Perhaps the biggest challenge for our task force was the study design and the fact that ME/CFS was not included at the very beginning of the design. Now there's agreement that certain questionnaires and assessments that help capture the ME/CFS phenotype should be included in RECOVER. Anytime you change a protocol or a study design that's this huge, even a couple of questions into a survey has a huge ripple effect on the rest of the study. That's probably one of the biggest challenges right now. It's not a do-over, but it's definitely figuring out how we can do this and make it work.

Barr: There must also be challenges in terms of in terms of accepting the data. How has that worked in terms of tweaking these questionnaires and then assessing them the same way? That must be very challenging.

Vernon: That's an important point. It ends up causing scoring differences—the way that it was originally scored, now it's no longer able to be scored that way. It has a lot of ripple effects. Thank goodness, there are so many people with so many different perspectives and expertise involved because they catch those things and make them work.

Barr: What do you think the task force has learned to date? What are some aspects of long COVID that you hope can be explored further, in both the short-term and the long-term?

Vernon: The task force is still learning. They've learned the importance of, or maybe some of the similarities of, ME/CFS with post-COVID and long COVID conditions. We are learning how a lot of the work that has been done with case definition generation for ME/CFS—which has been a very long, ongoing process—can help inform how we define things like long COVID. That's happening. A lot of those lessons learned in ME/CFS can be applied to long COVID in the short-term and modified, adapted, or updated as needed so that in the long-term they can be used to define cases and make early detection of post-COVID, which might look like ME/CFS long-term, sooner.

[That would mean] early detection and diagnosis—and the recognition for patients that are survivors of COVID and are suffering from long COVID symptoms. We're still learning, but what we are learning and applying is going to be important, both in the short- and the long-term.

Barr: While RECOVER focuses on long COVID, what do you think that this initiative can do for patients with other post-infection diseases like it, like ME/CFS, that other programs have not been able to do, to date, for a variety of reasons? How do scientists, clinicians, and patients sustain the momentum of RECOVER?

Vernon: The pandemic, as horrible as it is, had opened the eyes and minds of the world to viruses. Everywhere you go, you hear about viruses, and so it's this incredible awareness opportunity that the pandemic has provided. Not only for acute infection, the kind of virus that we're used to—I get a cold, it's a virus; I get sick with the flu, it's a virus—but also the chronic consequences of that acute insult. The pandemic has put this right in front of our face. Now we understand that some people don't get better. That's long COVID. Long COVID is a new name, but for me, my research has really been focused on these chronic consequences—these postinfectious long-term consequences of getting sick with a virus or bacteria. RECOVER can seize this moment to change the way we educate and think about infectious diseases. This type of information being generated, and the knowledge we are gaining from RECOVER, can be influential at many levels of education, and particularly for medical education so that the next time this happens, there hopefully won't be people who don't get better. Or who go to the doctor and the doctor says, “It's all in your head.” They will say, “Okay, I get this. This is because of your acute infection. I'm going to deal with this.” And students will know about it. It's just this incredible education opportunity that RECOVER can take from the clinical work and the research work that is being done.

Barr: I know you work a lot with education and patient recruitment and empowerment. What do you think it will do for that? Often people feel shame about having chronic health issues and don't always admit to it or broadcast things of that nature.

Vernon: Well, that's where education comes into play, right? The only reason you feel embarrassed is because you've been told that it's all in your head, or that it's not real—at least that's my experience. At the Bateman Horne Center, we have incredible patient participant engagement. Patients are our partners in research and in education. With good education—informing people that this exists, that it's real, and that it can be dealt with—will change a lot about how we do research and medicine.

Barr: Will you share how the Bateman Horne Center, which was already engaging in long COVID research in late 2020, became involved with the Recover initiative in early 2021 and continues today?

Vernon: I was excited when I saw that funding opportunity come out in the beginning of the pandemic. Again, being a researcher from the Centers for Disease Control and working now with Dr. Lucinda (Cindy) Bateman at the Bateman Horne Center, our focus has been on post-viral fatiguing illnesses for a long time. We both knew that there was going to be post-viral fatiguing illness like ME/CFS following the pandemic. We reached out to Dr. Willard Dere, who at the time was Associate Vice President of Research at the University of Utah. It just so

happens that Dr. Dere was attending for endocrinology when during Cindy's residency at the University of Utah. That's how we were able to make that connection Dr. Dere arranged a videoconference with Cindy and me, and Dr. Rachel Hess, who is now the Associate Vice President of Research at the University of Utah. I gave them a presentation about post-viral fatigue and a proposed study design and what we should do—because we really wanted to do research. Of course, the pandemic was just going full bore ahead and it was all hands on deck and the proposal didn't move forward. But then the RECOVER Initiative happened. NIH announced that in May or June of 2020. Cindy and I were chomping at the bit to be involved. Then Dr. Hess reached out, and she said, "Would you like to be part of our RECOVER application?" We're like, "Heck, yeah." That's how we became involved. The application Dr. Hess put together is called the Mountain States PASC [post-acute sequelae SARS-CoV-2 infection] Consortium, or MSPC. Bateman Hornce Center is one of the recruiting groups for the long COVID cohort. Maybe I planted the seed back in early 2020 and they didn't forget us. That's how we got in. Doctor Hess said that we're the only group in RECOVER that has this ME/CFS expertise represented within the actual hub.

Barr: Can you talk a little bit more about the types of studies that have been included so far, and a little bit more about the expertise that you and others at the Bateman Horne Center have offered to this larger Consortium?

Vernon: It's evolving. RECOVER was designed to focus on acute COVID—people infected with this virus. That study design is intentional, designed so to understand why some people get better and why others don't get better. What we bring in currently with our ME/CFS expertise is knowledge that can help inform the current ongoing studies. There are about 15,000 people that have been enrolled in tier one, so it's a lot of questionnaires and basic assessments. As that data begins to be interpreted, I hope there will be the opportunity to see how things compare and contrast with ME/CFS and other similar diseases.

Barr: One particular study you are involved in looked at whether the 10 Minute NASA Lean Test would aggravate symptoms and produce objective hemodynamic and cognitive abnormalities in patients with long COVID and chronic fatigue syndrome. Can you speak a little bit about your role in that study, as well as how it was designed and some of the findings?

Vernon: When the pandemic started, Cindy and I knew there would be long-term consequences to this pandemic. We're in the last year of funding for these five-year collaborative research center grants, U54 grants, from the NIH for ME/CFS. We had large populations of ME/CFS patients and healthy controls involved in both a study that was led by Columbia and a study led by The Jackson Laboratory. Ian Lipkin is the PI from Columbia, and Derya Unutmaz is the PI from JAX, and we were the clinical core for the JAX study, and a project lead for the Columbia study. We're doing all of these assessments, collecting all kinds of samples for both centers. When the pandemic hit, we started seeing long COVID patients at Bateman Horne Center with the aim to compare to our ME/CFS patients. We received an administrative supplement to enroll our long COVID patients in both the Columbia and the JAX studies. What we published in that paper, using the NASA Lean Test, is just the beginning of what is going to be a fascinating story, especially when Columbia and JAX do all the molecular assessments that they're doing.

What we found in the Columbia study is that the long COVID patients are pretty darn sick, and they have more abnormal response to an orthostatic challenge than the ME/CFS patients do. They also have a much worse cognitive response to orthostatic challenge than ME/CFS patients do. Both groups are worse than our healthy controls. That is interesting and it parallels what we see in the clinic. Most of the long COVID and ME/CFS study participants are patients at Bateman Horne Center. By the time we did the study the long COVID patients had been sick for about a year and it is striking how sick they are. Our ME/CFS patients are sick for on average five years or more. In JAX's, we were able to have two ME/CFS cohorts, one that was sick for a short amount of time—less than four years—and one that was sick for greater than 10 years. Then we would compare them to our long COVID. What we found doing the same type of study, orthostatic assessment, and cognitive assessment, is that the short-term ME/CFS patients are more like the long COVID patients in their hemodynamic response and cognitive response, and that the longer-term ME/CFS patients are more like healthy controls in their hemodynamic response.

Barr: I thought it was very interesting from reading the paper that the trajectory of the symptoms was different between the ME/CFS patients and the long COVID patients. The long COVID group got better at the second day, but then they did a lot worse, where the ME/CFS patients just had a different response and type of recovery.

Vernon: Exactly.

Barr: Will you please speak about another project that you were involved in, which uses the DePaul Symptom Questionnaire (DSQ) to assess the frequency and severity of common ME/CFS symptoms to diagnose and monitor symptoms in patients with long COVID?

Vernon: This study was actually inspired by sitting on the task force and thinking about and discussing the need to incorporate ME/CFS-specific assessments and questionnaires into the RECOVER study. I said, "Whoa, we've got this data!" We'd been collecting all this data and we just so happened to collect the DePaul Symptom Questionnaire—all of my research studies collected the DePaul Symptom Questionnaire. I'm a clinical trialist. I'm a molecular biologist. I'm not a very good data scientist. I put it out there to the task force one day. I said, "Hey, I've got all this data, does anybody want to help look at it." Dr. Lenny Jason [from DePaul University], Dr. Carlos Oliveira from Yale, Derya Unutmaz, myself, and Cindy all put our heads together on this data and then did the analysis, which was published in that recent paper. What it showed, importantly, is that the DePaul Symptom Questionnaire in the short form, which is 14 questions, can be used to monitor symptoms over time. It can detect change in symptoms over time. And we did, in fact, see that symptoms in the long COVID population have improved over time. The ME/CFS population are sicker for longer, and their symptoms were pretty stable, which is not good news. The longer you stay sick, the harder it is to get any improvement, and it emphasizes the importance of early diagnosis and management. All of those patients are our patients, so they're being treated. That's may be why we saw improvement in symptoms.

Barr: Are you involved in, or plan to be involved in, any other efforts around long COVID?

Vernon: Oh, yes. There are more opportunities now. The increased awareness of the clinical similarities and overlap between long COVID and ME/CFS has piqued interest and companies are exploring working with us to study both ME/CFS and long COVID in clinical research and in clinical trials.

Barr: In addition to being a scientist, you're also a person who's been living through the pandemic these past three years. What have been some personal challenges and opportunities that COVID-19 has presented for you, and how have you coped with all the changes that the pandemic has brought on?

Vernon: Personally, I did get sick from COVID. It's a nasty virus. I've gotten sick multiple times. That's been my personal challenge. Thank goodness, I've recovered.

Barr: Did you get one of the original variants?

Vernon: I got sick in October of 2020. That's the Delta [variant]. I got really sick with that one. Then I got sick with Omicron, and then I got sick with the last one, BA.5. I was vaccinated and boosted so I don't know what's going on with that. But thank goodness I recovered. That's the personal challenge. Also, that experience of infection and experiencing this kind of outer body looking down at my sick body experience and understanding what's happening with my heart and my breathing and all that kind of stuff, makes it very interesting to think about from a research perspective, too. While that was a personal challenge, it also enhances the kind of research that I do and how I do research. It's challenging to be a scientist and it's always been challenging to be a scientist in a small nonprofit, like Bateman Horne Center, because we just don't have the same level of credentials that come when you're at a faculty in a big, prestigious academic center. But COVID has created this opportunity—because we are a small nonprofit and we can be very flexible and nimble, we aren't burdened by tons of bureaucracy. We can move very quickly. We've also always had a sense of urgency in our research and our clinical care when it comes to ME/CFS, in order to really have impactful change in our patient population. That urgency has not necessarily been the case for the rest of the world when it comes to ME/CFS. But the pandemic now requires urgent solutions—and we are in a good position to be responsive and help drive solutions that will improve the lives of many people.

Barr: Is there anything else that you'd like to add about your pandemic research or your personal experiences?

Vernon: I don't think so. I think we've captured everything.

Barr: That's great. It will be interesting for them to research why some people, unfortunately like you, have gotten the disease so much while others haven't gotten it at all. That is so interesting.

Vernon: Well, I've gotten it, but I've recovered. Another interesting research question is, why do some people get better, and some people don't?

Barr: Definitely. Thank you for all that you do, both for NIH and for patients with post-viral diseases. I wish you all the best.

Vernon: Thank you, Gabrielle.

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