NIDA International Forum – June 22, 2021 (Day 1)

STEVE GUST: Welcome, everyone. I'm Steve Gust. I'm Director of NIDA's international program and I want to welcome you to the NIDA International Forum, which is going to be held over today and the next two days, in the morning before the formal CPPD sessions start. It's a new model in our new virtual age, and we think this really met the needs of most of our participants, many of whom are in different time zones around the world, and we think this is the best possible accommodation to fit as many people's schedules as possible. I want to thank CPPD for their generosity in letting us share their meeting platform, which we think is fantastic and is really going to lead to a fantastic meeting.

I also want to thank a couple other groups and individuals primarily EMCDDA, who once again are participating as co-sponsors in this year's meeting by sponsoring some travel awards, which this year really involves meeting registration fees but in the future when we meet again face to face will become more of an actual travel.

Again, thanks to CPPD and Parthenon for sharing the meeting platform. It's been a fantastic learning experience for us and we look forward to it. Again, just to let everybody know, there will be a poster contest again this year that is being co-sponsored and conducted by the CPPD International Committee for the best poster. And finally, I want to thank all the participants and speakers who are volunteering their time and the poster presenters who submitted some really interesting abstracts that we've had a tough decision to choose which ones would be chosen for our oral session on Thursday, but everybody will be in the poster session.

And just to remind everybody, this is the landing page you see for the meeting, and we are the beneficiaries of our own poster session link this year, and just to clarify that this is different in the sense that there's going to be no scheduled manned hours for the authors to be at the poster, but the posters are going to be available throughout the meeting. You can click in on that poster session and view the posters and interact with the authors any number of ways, including leaving something in the chat. There's going to be dedicated discussion boards for the posters. And also if you want to do a live meeting, the virtual attendees lounge is available for your use. So, we'll see how all that goes. I'm sure it will go great.

Without further ado, we want to get started. We do have a tight schedule this morning. We have lots of presentations We also have a hard deadline in that we end by 9:45 at the latest so we give the CPPD organization a chance to get started sharply at 10:00. So, with no further ado, let's get started. Our first session this morning is some presentations on how NIDA has helped and worked with organizations to help develop the addiction workforce around the globe, and our first presenter is Kim Johnson, who is the Executive Director of the International Consortium of Universities for Drug Demand Reduction, ICUDDR for short, who is going to tell us a little bit about their activities in providing scientific writing to the organization. So welcome and thank you, Kim.

KIM JOHNSON: Thank you, Steve. As Steve mentioned, I'm the Executive Director of ICUDDR, the International Consortium of Universities for Drug Demand Reduction. I want to thank Steve and Judy and everyone at NIDA for giving us the opportunity both to conduct the project that I'm going to talk about as well as to present on it here today. Briefly before I get into the specific project, what is ICUDDR? ICUDDR is a global network of universities who are working together to improve education for people who are working in substance abuse prevention and treatment services. The way ICUDDR

started, it's a very new organization. It really only got its beginning in 2016 when the INL from the US State Department held a meeting in Hawaii—I'm very jealous I wasn't there—with the support of Colombo Plan and OAS, and universities from North America, Asia, the Middle East, Latin America, the Caribbean, and Europe to talk about organizing a group of universities that had programs that educate the workforce in addiction, both prevention and treatment, although there are actually very few programs anywhere in the world that focus specifically on prevention, they are almost all the treatment workforce.

And from that meeting, they came out with a document that identified some benefits of creating a network, and the goals were to promote education and training in substance abuse treatment and prevention, to advance applied treatment and prevention research, improve credentialing in the workforce—many countries don't have any kind of credentials for people who are doing treatment or prevention work—and to support this network and coordinate efforts worldwide to facility multidisciplinary integration across the world.

At the end of this meeting in 2016, they created ICUDDR, and they came up with the name ICUDDR, which I have never forgiven them for. It does not fit on any forms. I have to use the acronym; the full name doesn't fit on anything that we have to use it for. But it does describe who we are.

So here are our goals and purposes. Network development. The first goal that we had to accomplish—that meeting had fewer than 20 universities and we spent a lot of time trying to engage universities across the world in education—so our purpose was to engage students and professionals in the academic programs of addiction studies and continuing education in addiction studies, and also to promote career opportunities both in prevention and treatment.

And research, which I'm going to be focusing on after this slide, to advance applied research in addiction prevention and treatment. And applied is important there. Basic research is not something that we focus on, although supporting our members and connecting basic research is something that we may be able to expend energy on.

Enhancing our partnerships among university programs in the communities that they live and work in. So making sure that the training and education that's provided is practical and fits for the people that are being educated, and that the university is part of the community that they function in.

And finally, advocacy in terms of advocating within universities for the development of academic programs in addiction studies, advocating for policy change to support the development of academic programs in addiction studies, and to enhance and improve the services that are provided for people in different countries. And also to develop and advocate for guidelines and standards for academic programs in addiction studies. And perhaps next year I'll spend some time talking about that at this conference. We've only begun that work.

While applied research is being conducted in low- and middle-income countries, publication in peer-reviewed journals is low compared to higher-income countries, and particularly compared to the United States and Europe. And there's a couple of reasons for that. One is a language barrier that most high-ranking journals are published in English and if English isn't your first language, it's hard to write a paper that gets through the peer-review process. And another is that writing for publication is not a skill that's

taught in many graduate programs in any country actually, and people have to figure out how to do it by working with their faculty advisors or by trial and error.

The project that NIDA is supporting with us this year is a joint effort between ICUDDR and ISAJE, which is the International Society of Addiction Journal Editors. ISAJE has created and I think they are offering their training at CPDD this year. ISAJE has created a training that addresses these kinds of issues around publication and how to get your research published in peer-reviewed journals.

And we teamed up with ISAJE on two projects. The first one is to create an academic course in writing for peer-reviewed journals. We worked with ISAJE and came up with an announcement where we were funding with a very small amount of money a university to develop a course in their addiction studies program, so of course it would be part of the mandated education process that people have to do to get the degree. And we funded a small amount of money which we put out to bid, and we had seven applications. And they were all really good, but the one that we selected unanimously from our review committee was from Kenyatta University. They had a good timeline. They were going to launch the course in the fall semester of 2021, and it was going to be both a required course in their addiction studies program, but also an optional course in their psychology and several other programs, so it seemed like a good fit.

The Kenyatta University project is led by Beatrice Kathungu. We are in the process now, after having had monthly meetings, of getting the approval from the university for that specific curriculum. And they basically have translated the ISAJE content into an academic course to fit the timeline and learning objects and the process of creating an academic course. And the project is currently in process, on time, and I'm actually expecting to hear from them in the next week or two about approval at the final level, and then they will finish building out the course and it will be offered in September. The course content will then become available to other universities who are ICUDDR members to develop their own courses.

The second aspect of the work that we're doing with ISAJE under the NIDA funding is to have learning collaboratives of faculty in universities where they are basically learning by doing. They are working through the ISAJE training material with ISAJE. We have three ISAJE journal editors who are facilitating the learning collaboratives and they are working on their own publications. And it's basically a writers' group. They get together, they have a little bit of didactic presentation from the editors from the ISAJE materials and then somebody is presenting their paper and they're discussing their paper and how to improve it. And the ISAJE editor is adapting what they discuss at particular sessions based on the paper that is being discussed with the specific issues that might come out of it. And the faculty are then providing feedback to ISAJE about how they can adapt, how we can adapt this content for use in their courses.

So it's a parallel process where we have one university actually building a course, and then we have a total of 23 faculty in two groups that are working on using this content, learning how to improve their own writing, and thinking about how they can use that with their students in their graduate program. So two parallel processes, ultimately with the same goal of making sure that faculty are able to teach their students how to write for peer-reviewed journals and how to get their publications into peer-reviewed journals.

We're feeling really positive. This is just happening this year, I don't have outcomes to present, but we are on track. Everything is proceeding and I will tell you next year how it all went with 23 participants and the course at Kenyatta is right on track.

I would invite you to, if you don't know ICUDDR, check our website, iccuddr.org, and if you are a university—our membership is organizational, not individual. You're welcome to join our mailing list if you are an individual, but if you represent a university or if you are able to work through the process in your university to join, we would welcome your membership.

Remember that first meeting in 2016 had about 16 participants who became the original founding members. now we have 270 university members from 72 different countries, obviously all over the world, in the five years that we've been in existence, and four years since we've technically been a functioning organization we've had significant growth and engagement from all of our university participants. And I want to thank you and I didn't hear a bell, so I think I'm a little early. Hopefully I can buy some time for the next person.

GUST: Thank you very much, Kim. Yes, and I think you may have bought yourself some time to ask questions too. If anybody has any questions, please put them in the chat, but I have a couple to start with. The first is as a researcher I'm sure you've considered and built in an evaluation plan going forward for how successful things like the academic course and the collaboratives are. I'm just wondering what those are, what your expectations are, what your hopes are?

JOHNSON: A couple of things. For the academic course, our assessment of that is does it get launched, and does it get through the process, and are they going to launch on time, and do students actually take the course? It's a really simple, basic one. And ultimately for the next cycle, do other universities adapt or adopt the course materials?

For the learning collaborative there are two primary outcomes. One is publication, so do these papers that are getting discussed get published? And the second is how many of the—because it's faculty—how many of them take the content back and use it in their classes. The process would just be a survey at the end of the cycle, so pretty simple. To some extent, I'm also the PBS anchor, so to some extent it's looking at process outcomes and did we publish what we intended to?

GUST: My other question was you've got 72 countries, 270 members now. How many universities does that represent?

JOHNSON: It's 270 universities. Our individual mailing list is close to 1,000 faculty.

GUST: That bodes well once the curriculum is developed. Are the universities sort of waiting and anticipating and ready to slide this course into their curriculum offerings, or is it going to take some lobbying, persuasion?

JOHNSON: It's a process to create a new class. It's a process to create a new class even when the new class is—

GUST: —handed to you.

JOHNSON: Then if you make it mandatory—so a lot of this process with Kenyatta which it's good to document the process, they have a very clear step-wise process that has to be approved initially by

department group, and then it has to be approved by a college group, and then by the university. They are in the university approval phase now. And every university is like that, so while individual faculty may be eager, part of what we do is help them make sure they have what they need to walk it through the process in their university so that they can overcome those bureaucratic hurdles that are there for a reason but they're also huge barriers to getting a course approved.

GUST: Well, NIDA stands ready to help.

LISA JORDRE: Do you see the question in Q&A?

JOHNSON: Yeah, I just checked.

JORDRE: "Does ICUDDR have any efforts to put substance abuse lessons on the curriculum of universities?"

JOHNSON: Yeah, that's almost our whole point in being, that's why it was created, both to help universities put courses into programs like psychology or social work or education, but also to create addiction studies programs. We just at the end of 2020 completed our second membership survey, and I had about a 50% response rate, just so you have a sense of that, and at the end of 2020, still in the middle of the pandemic, we had 27 new addiction studies full programs at the associate, bachelor's, master's degree (I don't think any of them are PhDs) or postgraduate—a lot of places have postgraduate diploma programs—27 new programs in development that were to be launched in 2022 or 2023.

GUST: Thanks a lot. I think in the interest of time I'd like to move on, but thanks again, Kim. Really interesting, and NIDA stands ready to help as you move forward.

JORDRE: Kim, if you want to answer the one question, you can type in your answer there to Andia Meksi or we can follow up with you later.

GUST: Thanks, Lisa. I'm not sure why I'm not seeing that question in the chat. Is there a reason for that?

JORDRE: They're using the Q&A function rather than the chat.

GUST: Got it. Our next speaker is Mary Loos, who's an Associate Professor in the Department of Psychology at Virginia Commonwealth University. She's served as the VCU program director for the international Programme in Addiction Studies since 2006, which is a program that many of you I'm sure do not know about, but it's something that I think is a fantastic collaboration between several universities to provide graduate training on substance use and addiction and research. Without further ado, I'll turn it over to Mary.

MARY LOOS: Thank you, Steve, and good day to all, whatever time it is wherever you are. I'm really grateful for this opportunity to speak to you today about another NIDA-supported effort to develop the addiction research workforce. This one is a unique university degree-granting program known as, as Steve mentioned, the international Programme in Addiction Studies, or what we affectionately call IPAS.

I am the program director at VCU for this program, but it is a collaboration between three international universities, and I really want to focus on that today and tell you a little bit about the origins of the program, its founding, what we do, and how we are contributing (we hope) to the addiction research workforce. I also want to say I'm very excited about the course that's being developed through ICUDDR

because I think it would be really beneficial to our students, as well as some of the fellows that we have here at VCU, so that's really exciting.

A bit about IPAS. We are a unique, fully online collaboration of three of the leading research universities in addiction science across the globe: King's College London, The University of Adelaide in Australia, and VCU here in the US. And we originally offered a master's degree only, but now we also offer graduate certificates and diplomas in addiction studies. So the program has grown since its inception in 2008. In most ways, it is a very traditional academic degree-granting program. But what's unique about it is that these degrees offer a distinct international perspective, both because of the three universities teaching in the program but also because of the international diversity of our students, which is made possible because IPAS is a completely online program.

Right now that's not such an unusual thing, but in 2008, when we formed, it was actually quite unusual. And the degree also has the benefit of being uniquely portable because students receive what we believe is the only triple-badged diploma in the world, and also get to obtain a transcript from whatever university they choose. So whatever program is best known of the three universities in their region of the world, they can get a transcript from that program.

How did this interesting program come to be and what was its purpose? IPAS was the brain child of the four men you see in this slide. Many of you know these guys: Professor Sir John Strang from King's College London, from VCU Charles O'Keefe and Bob Balster, and from the University of Adelaide at the time, Jason White. But the program was brought to fruition by the three original program directors, who are the women in this picture. And like so many good ideas, it arose from an afterhours meeting at an addiction conference—can you imagine—where the founders were discussing ways to increase research particularly and leadership capacity in the field, particularly outside of developed Western nations where at the time there really weren't any academic training programs in addiction science.

And so the idea was to create a top-quality degree program that people could access wherever they were doing their work, building on the experience of our three partner universities. And NIDA was essential in supporting this process, exploring the possibility of what was kind of a crazy idea and in 2005 and 2006, generously supported curriculum development meetings that also included representation from WHO. And after four long years of development and going through the very structured process that Kim described to get a program set at three different universities, we enrolled our first students in 2008.

So from the beginning IPAS was a little different than more other addiction programs, particularly then, because it was focused on the development of research capacity, information literacy, and how to focus on public health and policy where most programs, particularly master's-level programs, in the field were primarily focused on treatment. Of course, IPAS students do study evidence-based interventions, but the course is not focused on the development of counseling or practice-related skills.

Over the last 13 years now, or 12 years of program offering, we have 120 master's graduates from 28 different countries on 6 continents and 12 certificate graduates as well.

What makes IPAS work and is it achieving its rather lofty-sounding goals? Well, let me answer those questions first by highlighting four unique aspects of our program—the curriculum, the faculty, the students, and the resources that are available to our students.

I'll start with the curriculum, the core of the IPAS program, the MS is a 36-credit program comprised of six content courses and a research methods and research project sequence which helps people take the skills that they learn in their courses and develop an original research project over the course of a year. The course content. The curriculum was developed in those NIDA meetings and includes courses across the range of topics in addiction science. And so that's biological basis, pharmacotherapy, psychosocial interventions, public health perspectives, addiction policy, and also critical issues. And each course is like a fairly deep mini immersion in a whole topic area, so this is a very challenging but very comprehensive program that gives people a wide range of information. And we have students from all different backgrounds—from medicine, from law, from policy, from research, and all of them are challenged because they are being presented with so much different information.

On this slide what you see are the course names. The colors indicate the different universities that teach into the course. So 1/3 of the curriculum is taught by each of the universities so people get these different perspectives in their coursework. And regardless of whether you're taking a graduate certificate or a graduate diploma or the master's, you have an equal number of courses taught by the three universities, so it really is international.

I do want to emphasize that this is a coherent, cohesive program. We work very hard to make this easy to access for students. They don't have to go to the different university websites to get the program; everything is offered through the VCU web interface and so students are in one place but the teachers teach in from wherever they are.

I want to give a shout out to our program directors and co-directors. We work very closely together to make this a seamless experience. The program directors and co-directors are also research supervisors for projects and most are active in the field of addiction research still. So we get together to make sure this works for students.

Now that you have a sense of the program structure, I want to focus a bit on our unique faculty, students, and resources. And I want to start with our faculty, who I will argue is probably the most distinguished and exceptional group of lecturers assembled in any academic program anywhere in this field. As you can see from the list of current and former lecturers, IPAS has enlisted a veritable who's who of researchers and thinkers in the field of addiction and students really benefit from this wide range of expertise. But of course the course directors as well are active in the field.

In addition to our exceptional and international faculty, we have exceptional and international students, and I always get super excited about showing this slide which shows where students have studied from in our program. As I mentioned before and you can see on this slide an example of our triple-badge diploma, which has the seals and signatures of all of our different universities, making it extremely portable and, as I mentioned, students study from where they are.

I would be remiss if I didn't mention before I go much further that IPAS is only one of two NIDA-supported educational programs at VCU, the other being the Humphrey Fellowship Program, which is a Fulbright Fellowship program that brings mid-career professionals from all around the globe to study in the US for a year. And much of the Humphrey Fellowship Program at VCU is focused on substance abuse and addiction. Because this is true, there has been a unique cross-fertilization of these programs, which has benefitted both. So on fellowship, any of our fellows take IPAS courses, and when they go back to their countries, they sometimes finish the program. So we have four graduates now and we also have

three former fellows who are currently through the first year of study in IPAS. So they bring their perspectives to our IPAS courses, and they also benefit from our faculty and other students. In 2021, 5 of 11 of our fellows took IPAS classes. And by the way, this picture was from a previous NIDA International Forum at CPDD in Palm Springs a number of years ago, and was a gathering we put together for both IPAS and Humphrey fellows.

Who is the appropriate student for this course? Who takes our course? Who are our alumni? This chart is taken from our recent alumni survey, showing the range of work being done by our graduates. And while a significant minority are involved in direct service, many contribute to training, program management, program development, evaluation, and research. and many of our graduates engage in advocacy and use their knowledge to influence policy.

One local example I always like to mention is a graduate of ours, Dr. Omar Abu Baker, who is actually the chair of maxillofacial surgery at my university. Dr. Abu Baker tragically lost one of his sons to an opioid overdose, and in his son's honor completed our program so he could be a more effective advocate for changes in opioid prescribing in medicine and dentistry. And in his five years since his graduation, he's been at the forefront of changing the medical and dental school policies on pain management and training and he's also testified before the US Congress, among other bodies.

What are our graduates doing and are they still engaged in research? And to what extent did the program move them in that direction? I can tell you from staying in touch and also from our alumni survey that about 10% of our graduates actually have gone on to complete or are currently completing PhD-level study, with a number of others currently applying. And that's in a lot of areas: pharmacology, pharmacy, health policy, psychology, so a wide range of PhD study. Approximately 20% of our alumni continue to be actively involved in research, and in several cases, clusters of graduates have formed research collaborations. We have two Nigerian graduates who since their graduation have actually collaborated on over ten regional and international journal articles. We have another cluster in Ireland doing the same. So the development of this capacity and the collaborations are happening.

In addition, a lot of our folks are using their degree to become involved in teaching and training evidence-based interventions and policy. So we have folks at major universities in a number of different countries—Myanmar, New Zealand, the US, Nigeria—who are doing a lot of teaching and training based on evidence-based practice.

This slide just gives you an idea of some of the titles and some of the important positions that our graduates are now in across a wide range of countries, from Abu Dhabi, Fiji, Australia, India, Nigeria and so on.

What do our students say about us? Students generally feel extremely confident in their research abilities, their ability to apply information to their practice. More than 95% say they can integrate evidence-based materials into their workplace or community, they can interpret research, relate their understanding to local and international policies, and we had 100% satisfaction rating—this is with a response rate of about 50%—for our alumni survey in 2019.

I'd like to share with you a brief video from two of our graduates, Dr. Shalini Arunogiri, who's Deputy Head of Department at the Monash Alfred Psychiatry Research Center at Monash University, and she's also the chair of the faculty of addiction psychiatry of the Royal Australian and New Zealand College of

Psychiatrists. And Mr. Keith Bhebhe, who's General Manager in Clinical Governance at Justice Health Victoria.

SHALINI ARUNOGIRI: The IPAS program was really interesting to me because it offered a very international perspective.

KEITH BHEBHE: The expertise from Australia, UK, and America into one program was just what I needed.

ARUNOGIRI: Over time I got to really develop relationships with the other students in particular. I was attracted to it because I could do it afterhours while still having a clinical workload.

BHEBHE: As a result of the IPAS, I was able to have the confidence to walk into a leadership position and actually challenge some of the policies. Also, the network that I managed to create.

ARUNOGIRI: I've maintained relationships through the course but also sought new connections internationally as a result of my engagement with the course.

BHEBHE: The program has changed me, yes of course, but the people who've benefitted are those that I work with and the patients that I work with. That is my experience of the program. It was just amazing.

ARUNOGIRI: I would highly recommend it.

LOOS: Some of our really excellent students doing amazing work across the globe. I also wanted to very briefly highlight some of the truly amazing resources which help students to develop their skills that I believe might be unique in all the world. Students in our program are enrolled at all three universities, so they have access to all three university libraries, all of the databases, everything that's available. Also free access to a wide range of software, including statistical software, consultation services, and so on. They also have access to student services like career planning. Students can use the services at any of the three universities that are available virtually.

I want to highlight one particular resource that was put together for us by librarians at three of our partner universities. This is called the IPAS International Library. And for students in the program, this is a one-stop entrance into the three libraries and all of the resources that are available to them. And our librarians who've been very personally involved in our program have put together specific resources in one place through what they call Library Guides—for example, related to accesses gray literature, accessing different databases, books by course—and they've organized it in a way that's exceptionally helpful.

They also provide specific training, so in our research project course, for example, in addition to writing their master's project under the supervision of one of the faculty at one of the three universities, we make students do poster presentations, and we have a conference at the end of our year, so our librarians do training on how to put together good posters. They have to do recorded presentations kind of like this to present their research, so they gain research skills, they gain presentation skills, and they learn how to do a lot of the things that researchers will do with their final products.

In addition to publishing together, by the way, several of our students, I think four, have also published with their faculty advisors.

So there is a lot of support. For example, the ten students who are now working on their research projects, some of them are doing systematic reviews. The librarians work with them about setting up their research strategies and developing these very important skills for their future research activity.

One final aspect of our program is the fact that students obtain a degree conferred by all three universities, making this, as I mentioned before, uniquely portable. And a fun aspect of the program is that students can actually graduate at any of the three universities and go to their ceremonies and participate. So what you see here are a student from Hong Kong graduating at King's College London, two students from Brisbane going to Adelaide to graduate, and then an Australian student, a student from Kenya, and an American student graduating together at VCU—pre-pandemic. So we try to continue to support our students in any way we can and to work with them to continue to develop their abilities and capacities.

That brings me to the end of the presentation.

GUST: Excellent, Mary. Thank you very much. I think in the interest of time, Mary, I'm going to ask you to respond to the question in the Q&A and I think for the presentation we need to move on. If we have some time at the end, we can come back and take general questions for everybody.

The third presentation in this first panel is going to be made by Laurie Krom, who is the Director of the International Technology Transfer Center Coordinating Office at the University of Missouri—Kansas City. This is another, I think, fantastic development globally, and Laurie is going to tell you a lot more about it. But I think it's the kind of resource that I think, along with the IPAS program and the ICUDDR, represent three of the best global/international venues for resources for those of us interested in substance abuse research and evidence-based programs. Without further ado, Laurie. She was with us a second ago. There she is. Hi, Laurie.

LAURIE KROM: OK, I'm back. That was terrible timing, it just dropped off. Thank you very much for having me. Let me share my screen and hopefully it will not cause it to crash again. Again, thank you so much for having me. I'm going to tell you about a new program called the International Technology Transfer Center Network. We are actually a program of the International Consortium of the Universities for Drug Demand Reduction and we are receiving support from the US State Department bureau of International Narcotics and Law Enforcement, and that funding goes through the Colombo Plan Drug Advisory Program.

There are a few key points that I'll make along the way here. ITTC is our university research institute-based centers, and it's a branch of ICUDDR. Our aim is to accelerate the diffusion of innovations. We aim to employ systems thinking and build capacity across multiple levels. We currently have ITTCs in South Africa, Ukraine and Vietnam, and we actually are doing our first orientation training for the United Arab Emirates next week. And then we will be bringing on Peru in July and Indonesia in August, so we are excited about the growth of the network.

An international technology transfer center is a university or research institute-based center that builds the capacity of systems, organizations, and people to provide high-quality substance use prevention, treatment and recovery services. And the ITTC network is based on a US-based network of addiction technology transfer centers that has been functioning for almost 30 years with US domestic funding from the Substance Abuse and Mental Health Services Administration. The initial expansion of this idea

of having technology transfer centers across the globe happened because the US State Department President's Emergency Plan for AIDS Relief was looking at how to reduce new HIV infection in areas that were being really affected in their HIV rates because of substance use. And so they wanted to expand substance use treatment capacity in those countries, and so originally there was a partnership between PEPFAR and the State Department and SAMHSA, this US domestic agency, to create HIV ATTCs—Addiction Technology Transfer Centers—and then that funding ended and we saw a real opportunity to take this to the next level. We're no longer focused internationally specifically on HIV work, and we're able to expand to looking at how we build capacity across the continuum of care, including prevention for substance use.

We are based in universities or research institutes in countries across the world because we need to be able to tap into the expertise and experience of faculty in those universities. In many areas, universities are seen as neutral conveners and so where systems work needs to be done to bring many key stakeholders together to strategically plan how to advance drug demand reduction in a country, we need to have a convener who can serve as a neutral party without political ties to a specific government administration, for example. And this ability to tap into the expertise of university faculty and to serve as a neutral convener allows for more continuity across the years and also sustainability.

As I mentioned, and it's very nice that Kim went first in this panel presentation, because ITTCs are a program of ICUDDR, so Kim talked to you a little bit about the way the ICUDDR is supporting research development across the globe and the purpose of ICUDDR to infuse academic programs with substance use information. And the ITTCs are kind of the third branch of ICUDDR so our program here is a collaboration with the headquarters of ICUDDR. I'm located at the University of Missouri—Kansas City. We serve as the coordinating center for the network to support collaboration, communication across the ITTCs, and then also with the three US-based technology transfer networks, the ATTCs, which I previously mentioned, the prevention TTCs and the mental health TTCs.

Why are ITTCs needed? We've talked a lot about building research capacity, there are a number of training programs for individuals who want to be professionals in addiction treatment and prevention, so what's the purpose of the ITTCs? Really, this is our model of technology transfer that was originally developed by the addiction technology transfer centers, and it shows the continuum of the diffusion of innovation.

This is a picture of how we think about how research and/or innovations—could be standards, evidence-informed policies—get into regular use. And while we understand that this is a continuum, we really want to accelerate how fast this happens, how fast we go from development to implementation, and that process of accelerating the diffusion of innovation is what we call "technology transfer."

We have on our website, which I'll show at the end of this presentation, some recordings of presentations and some other materials that explain what we mean by this model, so I won't belabor it here, but I wanted to mention that this is meant to be a very high-level 30,000 feet above look at the process of getting an innovation in to practice. It's not meant to be a specific implementation model but rather a way to illustrate what happens, what's going on on the ground when we're working on getting research or evidence-based practice into actual use by people.

Again, we're looking at why ITTCs are need. What we know is that many times we'll have effective interventions, but we have ineffective or inefficient implementation, and that can lead to inconsistent or

not sustainable or poor outcomes. And of course, that's a problem in and of itself to have not sustainable or poor outcomes, but what we really have acknowledged and realized over the years, especially working with the ATTCs in other countries is that if we have an effective intervention and it has been insufficiently or ineffectively implemented, then people will blame the intervention. So we hear things like, "Oh, treatment doesn't work and we should just go back to putting people in prisons because we can't treat substance use. It doesn't work." Or "Why invest in prevention? All these evidence-based programs, it never works." And it really isn't that the intervention isn't working; it's that the intervention has not been effectively or sufficiently implemented, so it has not created the outcomes that can happen when we do have good implementation.

And this is my favorite Dilbert cartoon that explains oftentimes what happens when we have this kind of ineffective roll-out of a practice. He says, "I'm back from a training. I got a binder!" How many of us have gone to trainings and gotten binders? And then he says, "The training is already forgotten but the binder will last forever, a living monument to temporary knowledge." So all of those training binders or manuals or other materials we've gotten at trainings that are on our shelves that are never to be opened again; that's what we call ineffective or insufficient implementation. We need ITTCs, or this process of technology transfer, to accelerate the diffusion of what is known to what is done in practice in a way that can get us to the outcomes that we know can happen through these practices.

How do we do this? I mentioned earlier we employ systems thinking. And as you know, systems thinking is a way of approaching problems that asks how various elements within a system—which could be an ecosystem, it could be an organization, something more dispersed, any kind of system—how those various components influence one another. So rather than reacting to individual problems that arise, someone who is looking at a systems approach will ask about relationships to other activities within the systems and look for patterns and seek root causes. So ITTCs are different in that we're kind of looking at this big picture. We're looking at all of the pieces that come together to create the puzzle of how we influence substance use prevention, treatment, and recovery services in a country.

What capacities, then, are we developing as we do this? We're looking across individuals, organizations, networks and systems. We're certainly doing training and academic programming and other events that will support the capacity-building of individual substance-use professionals, but we're also working with organizations themselves to look at how they build their capacity—for example, an individual substance-use treatment clinic or a specific recovery service organization.

We can also work with networks. There are membership networks, for example. One of them on the international stage that I hope you know about is the International Society for Substance Use Professionals, ISSUP, and I can put that in the chat afterwards. That's an international membership organization that we can work with to help them learn more about evidence-based practices that they can then use to promote to their membership.

And then systems. So it could be like a hospital system, a particular group of stakeholders in a country that work in various systems.

Multiple levels. We're looking at building capacity. And then what kinds of capacity are we developing? Again, looking at various levels of capacity. Technical capacity, so the actual content or subject matter expertise that we are dealing with—in this case, substance use prevention, treatment, and recovery. But we also help with organizational development, process improvement strategies and other kinds of

operational capacities. Systemic capacities like how to collaborate across systems, how to create long-term strategic plans and facilitating that process.

And then you can see here also we're looking at adaptive. We know systems are complex, they change over time, so how do we make sure that when we're developing capacities they are adaptive and can change with changes in environment or governments or new innovations that are developed.

And finally, influencing, so really looking at how we make sure that we are developing the kind of leaders and the kind of organizations and systems that will advocate for evidence-based practices and continue to develop and grow individual countries and capacity for drug demand reduction long after we're gone.

GUST: Excuse me for interrupting, Laurie, but you've got about 1 minute or so.

KROM: I didn't hear the ding, sorry.

GUST: I didn't either.

KROM: I'm going to go quickly, then. We use training and technical assistance and we have various definitions for these different kinds of activities. Technical assistance we view as having various levels—basic, targeted and intensive, and I actually think that Dr. Dean Fixsen explains this very well in that basic technical assistance is letting it happen; targeted technical assistance is helping it to happen; and intensive technical assistance is making it happen. So those are the levels that we use.

And as I mentioned, we have ITTCs currently in South Africa, Ukraine, and Vietnam. We will be having more coming soon in various countries, including UAE, Indonesia and Peru, and that's our website address and we do have a Facebook page that promotes various events and activities from all the ITTCs on, so we encourage you to follow some of these. And thank you very much.

GUST: Thank you very much. Look forward to inviting you back in the future. This is all very exciting to me and to us here at NIDA and we look forward to partnering with you as you go forward as well. Again, if anybody has any questions, feel free to put them in the chat and Laurie can get to them. if we have time at the end we'll come back and answer a few questions.

JORDRE: If you put them in the Q&A, then the speakers can see them and be able to respond right back there.

GUST: Great. Thank you, Lisa. Moving on to our second panel for this morning's session. I've already noticed a lot of interest in presentations at the CPDD meeting on the impact of the COVID pandemic over the last year and a half now on our areas of interest in terms of patterns of substance use and its impact, and most of those have been focused on the US, but of course it's a global phenomenon, and we have two speakers with us this morning to give us some orientation about what they are seeing in Europe and around the world. The first presenter is Paul Griffiths, who I think most of you know, who is the Scientific Director at the European Monitoring Center for Drugs and Drug Addiction, or EMCDDA, who is going to be giving us a little snapshot of what they're seeing now in the European network. So welcome, Paul, and thank you.

PAUL GRIFFITHS: Thanks, Steve. Good morning, everyone. It's a great pleasure to be here. I think the first time I've spoken at this meeting where my body clock is not telling me it's the middle of the night.

It's a nice change. It's a less nice change not to be with you. What I'm going to talk about today is how COVID-19 has impacted on the work of the agency. I work for the European Monitoring Center for Drugs and Drug Addiction, or the EMCDDA, as it's better known. And for those who don't know, we're also responsible for drug monitoring in the European Union.

When the pandemic first hit us, we had the fortune to have a good business continuity plan in place. And I have to admit, I've never taken that very seriously, but it did help us to start remote working very quickly. And after that, given the lack of information and chaos at the time, our first priority was to establish a dedicated information hub for our national stakeholders with the idea of encouraging sharing of experiences.

But then we very quickly came to realize that our routine reporting model had very quickly become very much less relevant. We were working at the time on our 2020 report which usually comes out May/June time, but because we use a lot of data from national registries, it is based on information from 2018, 2019 at best. So I guess we realized it's a bit analogous to us providing economic analysis just after the 2007 financial crash based on data on how well the economy was doing in 2006. It simply wouldn't be relevant for our stakeholders; they wouldn't be interested. So there was an immediate decision to delay our 2020 report and launch a rapid-reporting exercise.

I think we've been lucky in this respect as we've been trying to improve the timeliness of reporting, and this involved us developing more rapid information sources, and it's also included us developing a mixed-method rapid-assessment approach. I think with hindsight we could have called it something a bit more scientific or technical, but it currently goes under the heading of a trendspotter study. So we immediately launched a series of trainspotter studies.

For those of you that are interested, you can find our trendspotter manual online, but I guess I would describe it as a flexible but structured rapid-assessment approach. It's nothing particularly new in that sense. So essentially we use a mixed-method approach with both qualitative and quantitative elements. It starts with some targeted studies or very rapid small data collection exercises or re-analysis of ongoing data we're collecting. We try to neutralize where possible more sensitive or developmental data collection sources. It's always based around multidisciplinary engagement and the triangulation of data from multiple sources.

And the analysis of data—and this is where it's a little bit different, I think—is always conducted through a co-production process with the experts involved. So we collect data, we discuss it together, and then we analyze it in co-production mode. And very important, we try to be cautious in presenting the results, always noting it's a preliminary exercise that requires verification against flow with more robust data sources or research when these become available. But it has proved invaluable, in my opinion. As you can see here, we went from project initiation to reporting in five weeks for our first COVID trendspotter exercise, which you can't see because I advanced the slide too quickly.

This current slide gives you an idea about the range of data sources we used in the last trendspotter exercise that was looking at the last half of last year, beginning of this year. We included some developmental data sources, so we have data from a project analyzing syringe residues, for example, and data analyzing drug checking or pill checking services for new data services for us.

However, what proved particularly useful was we were able to look at levels of drug residue in wastewater with samples collected both during lockdown and the period immediately after this period. And this is important because the behavior during the period of severe lockdown was clearly very different to the subsequent period of social distancing. And we could also compare both of these periods with data collected from the same time in 2019.

And I think a very important caveat I have to make here when you look at these data sources is that they all suffered from issues of representativeness, completeness, and the fact that sometimes they cut a slightly different time period. Countries went into lockdowns at different time periods, and that all needed to be taken into account, and this is why data triangulation and testing the results with experts from different sectors and different countries was critically important. This is why we also need to be cautious and meta-analysis is going to have to be necessarily preliminary.

Let's look at some of the data then. These are findings from the trendspotting work overall, about six or seven studies now. First, I think we can say that overall the evidence suggests that the drug market proved to be remarkably resilient during the COVID-19 disruptions within the EU. And overall, we're not seeing any strong signals that drug trafficking in Europe or drug production has been seriously disrupted by the pandemic. We did see some adaptations. Not surprisingly, a dramatic decline in drugs trafficked by air; there simply weren't any planes; but this was compensated by increased smuggling via intermodal containers and commercial supply chains. And we generally saw more increased reliance on sea routes as land borders became more restricted due to COVID people-movement restrictions.

Just to give you an illustration of this, this is data on cocaine seizures at the Port of Antwerp, a major entry port into Europe. And you can see that in the first three months of 2020 that there were actually greater numbers of seizures when compared to the period in 2019, as you see down here, and although some of the routes had changed somewhat during this period. The retail level appears to be more disrupted by lockdown and social-distancing measures, and we did observe that COVID-19 restrictions led to temporary shortages and higher prices for drugs in some places, particularly during the first lockdown period.

But critically, I think, importantly, local drug markets appeared to innovate quickly in response to this, and we began to see an acceleration in a trend we've been seeing in recent years now for the drug market in local drug distribution to become increasingly digitally enabled. And I guess if we think about this, it's not really that surprising. To some extent, it simply mirrors what we've been seeing in legitimate commercial commodities. I've been buying more things online and certainly my family have.

An interesting example here can be seen in some work we're doing early in 2020 looking at activity of darknet markets. Cannazon is a cannabis marketplace, and we observed during the January-March 2020 period that the total values of sales actually fell on this marketplace. And you might think that is a little bit surprising given what we just said. When we looked more closely at this, we saw it was caused by a decrease in sales in high-weight categories, but we also saw some quite heavy discounting. But at the same time, there was an increase in low weights, 10 grams and below, and no price changes here. So this might be explained, we suspect, by those buying large quantities of cannabis on this market for resale, predicting the impact of lockdown and then leaving the marketplace whilst those looking to buy cannabis for their personal consumption and worried that local supply might be more difficult were entering the market. And I guess the big question will be if we will see any longer-term implications in future buying practices, especially if more people get used to sourcing their drugs digitally.

I think really then one of the potential longer-term impacts of COVID will be that it may increase even more than we've been seeing the digital enabling of local drug distribution. And we are seeing some evidence that this is happening. We're seeing more purchases are made online or via apps or smartphones and then distributed using parcel or postal services.

But we're also seeing I think important changes in modi operandi of drug distribution reported. We see the impersonation of food-delivery services to deliver drugs. So it's not just our pizzas and hamburgers that come by delivery driver but also drugs. And we've also seen the use of dead-drop techniques borrowed from espionage to tradecraft using GPS technology to locate where the drugs have been left. And whilst I think there is possibly greater interest in the darknet sales, we've seen some evidence of that, this is still relatively a complicated way of sourcing drugs, and I think the integration of social media and encrypted apps into local drugs distribution practices is probably now the area we should be looking more closely at.

In terms of drug use patterns, the lockdown period was responsible for what we call a move from nightlife to home life, or from going out to staying in. and we saw evidence that the use of drugs like cocaine and MDMA seemed to be significantly diminished during the close of nightlife venues and cancellation of music festivals and big events. These were substances that people appeared to see as less attractive for use in home settings or use when alone. But interestingly, these drugs did appear to bounce back quite rapidly after the most severe social distancing measures were lifted. So after the initial lockdown in the summer period, people going out again, there were legal and illegal big events and drug use kicked up again there.

There were also signals of increased use during lockdown of psychedelics and dissociative drugs, drugs like ketamine, for example, and drugs for boredom and escapism, and these drugs may be more suitable for use in a home setting. We saw no evidence of a sustained impact on cannabis availability. A little bit of shortage at the beginning of the lockdown, but that was all. There were some reports from a large web survey of regular users using more and occasional users using less, and that might be linked to social or more compulsive patterns of use.

There were also some possible warning signs. In terms of evidence of bounce back after lockdown, we're a bit concerned at the moment about the possible impact on drug-related deaths. We don't have a good picture of this from the current data, but from the preliminary data we are seeing perhaps a decrease in deaths in some countries during the lockdown period, but then an increase after this ended and possibly an increase in deaths overall. We're seeing a little bit more mention of opiate substitution medicines and deaths, and that's a little bit worrying. So this is something we'll be looking at as more robust data becomes available. We're certainly concerned at this point in time.

We've also had concern about reports from different sources of cannabis adulteration with synthetic cannabinoids. This is a relatively new phenomenon, linked, I suspect, to now in Europe the widespread availability of legal, low-THC products in many countries. So you can legally buy stuff that looks like cannabis and smells like cannabis but contains very little THC, and who would have guessed it, some people appear to be seeing this as a business opportunity and adding cheap, synthetic cannabinoids to this low-THC cannabis. And this is a real concern as we're also seeing outbreaks of deaths and acute intoxication associated with these substances. So if they are starting to turn up in what appears to be to consumers of natural cannabis products, this would be a worrying development.

We also have more reports of crack cocaine use and the diffusion of crack cocaine to new areas where in the past it's not been observed. And crack use in Europe has always been traditionally very, very limited both geographically and in terms of numbers. So we're seeing some worrying signs there.

And also reports of smaller, cheaper doses of heroin, crack, and benzodiazepines have started to appear on the market, possibly reflecting the impact of COVID-19 on marginalized groups, especially people who earn their living on the streets or through occupations that have been affected by the pandemic.

We've also seen evidence of a rise in benzodiazepine use. Perhaps that's a possible indicator of the pandemic's psychological impact. We've just released a report on new benzodiazepines. These are increasingly appearing on the NPS market. These share a similar chemical structure to benzodiazepines authorized for medical use and may sometimes be packed in a way to appear to look to users like legitimate diverted medical products, or they are simply sold as blue pills in plastic bags alongside other drugs on the illicit drug market. These are very cheap, seem to being increasingly available, and we suspect we are not monitoring sufficiently yet public health impact, so they are probably now playing a more important role in, for example, opioid drug-related deaths, but their presence may not always be detected or recorded. We're not very good at tracking drug interactions in our toxicological and forensic data. Also worrying, they seem to be becoming popular with young people where they are used with alcohol, often high dose, resulting in violent or other aberrant behaviors, and that's a concern.

Just to show you quickly here some of the wastewater data, on this side of the screen what we have is a comparison of cocaine metabolite loads between 2019 and 2020, and what we see is really the mean levels of the main cocaine metabolite from wastewater analysis in European cities was, if anything, stable or a little bit higher in 2020 when we look at the year overall than it was in 2019. But I think what's most interesting is this side of the slide. We can look at the levels of metabolites found during the lockdown period and then immediately after it, and what we saw overall, and particularly in cities with large consumption, was a decrease during the lockdown period in many cities, then a big bounce back in levels of drug use directly after this period ends. We see it's a very similar picture for MDMA, although perhaps the annual levels are slightly under that seen in 2019. So just an example of how wastewater analysis is part of real-time monitoring.

I wanted to finish by saying a few words about drug services. I think many services were forced to rethink their operational models during the COVID period. We see some liberalization in operation practices, especially around the prescribing of opiate substitution medicines, so quite possibly a more flexible approach being introduced to deal with access issues. And our impression is that the provision of OST medicines continue to be finding not too much disruption for those who were in treatment at the beginning of 2020, but there was most certainly more disruption to treatment provision during lockdown and for those new-help-seeking episodes. And we saw catchup in respect to increased treatment demands during the second half of 2020 reflecting this. So if you were in treatment, we more or less managed to maintain contact, but if you were looking for treatment, it was much more difficult during this period.

Telemedicine, not surprisingly, has become more commonly used now, and this is viewed overall as a more valuable tool by services than it was before the pandemic. Services learned a lot. And this is positive, I think, but concerns also exist particularly in respect to the risk of patient dropout and some marginalized groups may have difficulty accessing this sort of care. And also you've got the quality of

what's being delivered. So I do think we need to put more efforts into studies of the effectiveness of the health service delivery models.

And finally, we have some evidence of a reduced availability of illicit drugs in the prison setting due to the impact of social distancing measures. A lot of drugs in European prisons come in through from visitors from the outside or contractors entering the prison, so that seems to have dropped off. But accompanying this have been increased concerns about mental health problems amongst prisoners, especially those who spend more time in isolation due to social distancing measures. And also increase in prescribing and treatment of mental health problems within the prison setting.

Finally, to finish with some concluding remarks, the situation has changed very rapidly over the COVID period, so I think the questions we are trying to address have also changed very rapidly, and now I think really what's important is what is likely to be the implications for the future rather than trying to record what happened in the past with increased precision. COVID-19 highlighted the need to be able to report rapidly, but with today's modern information ecosystem, more timely, sensitive reporting has become ever more important, I think, but also ever more possible. And as an information center, we need to think at a systems level if we are going to remain relevant to our stakeholders in this area. For us, this means complementing our routine reporting, which is mostly reactive, with more proactive threat assessment and early-warning measures. And also what I haven't had time to talk about today, introducing more speculative and anticipatory future foresight capacity to try and increase the preparedness of our system for future development—or in simple terms, I think COVID-19 has highlighted for us that we need as an information agency to be able to comment on the important things that have happened, what is happening now, and what may happen in the future that are likely to impact in important ways on our work. Thank you very much, and I apologize for the dog and the delivery men during the presentation.

GUST: Thank you very much, Paul. Again, I think in the interest of time we're going to move on, but any questions for Paul, please put them in the Q&A so everybody can see them. The last presenter for this morning is Dr. Mustafa al'Absi, who directs the Duluth Global Health Research Institute. He has also been the leader of Khat Research Program and chairs the Africa and Middle East Congress on Addiction. He's going to tell us about the substance abuse findings from the Global Study of Stress and Resilience In the Face of COVID-19. Welcome, Mustafa.

MUSTAFA AL'ABSI: Thanks, Steve. Good morning, everybody. Thanks to Paul. He set the stage as far as the substance use in Europe. But as you know, in the spring of 2020, as the COVID pandemic was starting to spread around the world we launched a global study to track how people were experiencing this upheaval and how they were coping with it. So the focus for my presentation is going to be giving you an overall look at what we've done and what we did during the initial months of the pandemic.

I have no financial conflict of interest to declare. My research program is funded primarily by NIH, by NIDA, with some seed funding from the University of Minnesota. Before I share with you the results, I'd like to acknowledge the team that helped with the survey, the team members within our university and many other colleagues from around the world who provided us with input and facilitated recruitment.

We all know that COVID-19 has produced significant shock to the world, leading to all kinds of disruption of normal life. The world was obviously not prepared for this amount of harm and chaos. The impact of the pandemic has been devastating globally. So far, we know more than 3.9 million deaths and 178

million documented infections. And of course the huge social and economic consequences. The impacts on our lives are likely going to be felt for years to come, and this is going to be manifested by ongoing and delayed costs on many facets of our lives.

For us here, we believe that the delayed impacts on mental health and on substance use and other behavioral factors are going to be tangible for years to come. So our team worked virtually to launch this global study initially in English. That was in March 2020. We also translated the survey to eight other languages, including all UN official languages. We used multiple approaches to recruit around the world using social media and professional contacts and other contacts as well.

In this initial study we examined the experience of stress, uncertainty, depression, and other psychological symptoms associated with COVID-19. We also assessed sleep and other health-related behaviors and used tasks called Delay Discounting to measure impulsivity and decision making. The survey also included questions about attitudes, perceptions, media consumption, and other behaviors related to the pandemic at the time. We also assessed substance use and misuse, focusing in this initial stage in the spring of 2020 on alcohol, tobacco, cannabis before and after the pandemic. That's what we tried to capture in that survey. When I mention the data I'm going to talk about decrease and increase, and I usually used 25% threshold for increase or decrease of consumption.

Finally, we also collected facts related to resilience and other factors that facilitate coping with this uncertainty and the amount of stress introduced by the pandemic.

So we did publish and circulate a detailed report of the initial phase of the survey. The report has more information on the methods, recruitment and recruited sample, and the overall results. For now I should just mention that the sample we had initially in the spring of 2020 was 5,123 participants with completed survey. The sample included men and woman 18 years or older. The study was approved by our institutional review board at the University of Minnesota.

This graph shows some demographics of the age and sex. As you can see, most of the responders were young and middle-aged individuals, and we had more women than men in this sample.

I will next share with you some highlights of the findings. You will see that the results for the baseline numbers which are related to the status of these measures before the pandemic are always going to be in blue, and the changes during the pandemic are going to be in red. The pandemic numbers are always going to be red, so whenever you see red that means we were asking people about how they were feeling at the moment during the pandemic.

What we will be looking at is the shift from the numbers from the left to the horizon line on the X-axis to look at the changes in terms of increase of reporting of virus symptoms and conditions. This first slide you'll see includes data on depression. We see more of the participants reporting feeling depressed some to a lot of the time during the pandemic compared to the numbers reported that level before the pandemic. We see that the numbers of these reported significant amount of depression doubled to tripled during the pandemic. This is consistent with subsequent national and international reports that came out to reflect the amount of depressive symptoms that were prevailing during the pandemic.

We see also the shift for the measures on anxiety, the shift of distribution is clear toward having more anxiety during the pandemic. Again, these are the red bars where we see multiple folds of increases in the number of people reporting significant levels of increase relative to before the pandemic.

We also see the same shift with reporting stress. We asked several other questions about how people were overwhelmed with the changes that they were encountering, and the shift occurred there. We also, as we would expect, saw a lot of significant increases in reports of feeling socially isolated. And another construct we focused on considering the circumstances was uncertainty. So we asked about various demands of uncertainty, how people felt about the uncertainty about their health, their social, their finance, their work and their life in general, and we saw across-the-board increases in level of uncertainty escalating as people went into the lockdown and tried to cope with those early phases of the pandemic.

As mentioned earlier, we also assessed substance use changes before and during the pandemic. We focused on tobacco use, cannabis and alcohol. We are expanding these measures in our longitudinal version of the study to include opioids and other substances. What we saw here an increase in use of all nicotine products. On this slide you'll see that is noted in the red box and the yellow are the decrease. And note that the increase was about 20%, although in the US sample we had a bit more. We will see the same escalation of use with alcohol in the red, about 20% increase, greater proportion in the US. These numbers are from those who said they use, so this is not proportional of the entire sample but from the people who said they are using alcohol, cannabis or tobacco.

The same pattern we see in cannabis where we saw about 30% increase, particularly in the US sample. We actually saw that increase was even greater in those people who were more regular daily users of cannabis. And again not to forget that we also saw a decrease in the number of people that were using less cannabis during the pandemic, less substances across the three types of substances.

In a series of regression analyses we found that experiencing higher level of depression, stress, social isolation, uncertainty and poor sleep quality during the pandemic did predict increase in nicotine use. We saw similar patterns with different configuration of variables all indicating that heavy mental health load was associated with increase in alcohol use. Sleep also emerged as an important factor in various analyses. Same thing with cannabis use.

As you can see here in this simple figure, we noted that all these variables that we collected, or many of them, interacted in a very dynamic fashion. We actually zoomed some of this set of measures and looked at a specific analysis. For example, here we evaluated the connection between social isolation, depression and anxiety and how they relate to sleep quality. We found that social isolation increased depression and anxiety, which in turn affected sleep quality during the pandemic.

Then when we examined the role of resilience in buffering the impact of social isolation on negative mood and sleep, we found that the impact of social isolation on mood and on sleep decreased as the level of resilience increased. These findings were recently published and I'm happy to share those with you if you are interested.

We also found that uncertainty affected mood and increased depression and anxiety disorders which then led to other consequences, but resilience and dispositional and social factors that enhanced resilience did buffer the impact of uncertainty on these consequences.

We have also examined the role of delay discounting in mediating the effect of stress on various COVID-related behaviors. Delay discounting measures, impulsivity produced position to engage in behavior for immediate reward versus delayed. Delay discounting was a significant mediator of the relationship

between stress and these behaviors, the various risk-taking behaviors—in this case specific to COVID-related physical distancing. And although this mediation of the latest counting was not complete, it did influence, however, or accounted from some variance of the impact of stress on these behaviors.

The question is why are we seeing all these findings on substance use, on mental health consequences? Well, our research and studies by others over the years have demonstrated increased drug use during societal upheavals, societal changes like economic downturns and other types of societal stressors. When these things happen, like living through a pandemic, you start seeing what we observed in this study: deterioration of mood and deterioration or increase in mental health symptoms and conditions, increase in stress and uncertainty, increase in social isolation, and in the case of substance use, you see a reduction of treatment options, at least initially—in this case because people were afraid to contract COVID if they go to a facility and also facilities were limiting access to care for substance use situations.

So that, in combination, these factors would manifest themselves in terms of increase of use, engaging in high-risk behavior, and increase of mental health symptoms, which also can go on to lead to other behavioral risk-taking behavior, including again substance use.

So just to conclude, our research here has identified multiple malleable factors that can be addressed in order to enhance resilience and therefore buffer the impact of these stressors on mental health and substance use. I recommend that staying socially engaged, connected, and with others either directly or via other means of communication that's become available can go a long way to buffer or to enhance your resilience. Integrating healthy habits like physical activity, staying close to nature whenever possible, that should enhance one's mental wellbeing. Working cognitively through various challenges, basically thinking about the present and the future and not worrying about the past is a good way to shift your mindset and adopt more positive mental posture.

Then there is this big one that we discovered in our research, and that's the importance of good sleep. It's the best way you could do. And it's malleable. It's under one's control. It's a matter of how to learn to adopt a better and more effective sleep hygiene. So, thank you very much and this is some pictures from the used to be good days before the pandemic and hopefully the things to look forward to post-pandemic. Thank you.

GUST: Thank you, Mustafa. I look forward to future presentations. I think your work is going to be very critically important to guide us in the research field going forward. Looks like we're right about exactly on time, so thanks again to the presenters and see you all later.