Introduction to the Special Series on Addiction and Technology

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Imagine an app that collects data from wearable devices to alert people in recovery from addiction that they're at risk for returning to substance use and provides immediate, personalized support, such as the location of nearby 12-step meeting. Other tools on the horizon might be able to biochemically identify drug overdose and summon emergency services, or continuously monitor a patient's opioid withdrawal and help physicians optimize medications. By being available wherever and whenever patients need them, these tools have potential to meaningfully reduce harm from addiction. But, as Dr. Krishna Venkatasubramanian of the University of Rhode Island and Dr. Stephanie Carreiro of the University of Massachusetts Chan Medical School remind us, in the first of this month's *Special Series on Addiction and Technology* op-eds, we must take a cautious approach to such tools, making sure they meet the needs of the people they're designed to serve. Digital health interventions are usually designed with good intentions but not always with an understanding of the life experiences of end users, or the ways in which they could be weaponized to punish rather than protect vulnerable people.

In the second of this month's op-eds, we will continue discussing the promise and potential addiction-related harms of new technology. Mr. Saul Malek, an educator and speaker who raises awareness of the dangers of modern gambling, describes how he was introduced to app-based sports betting as a college student, with a focus on how the 24/7 availability of these apps contributed to his life becoming organized around betting. After nearly two years and a stack of financial and social consequences, Mr. Malek got help – using some of the same technology

that got him into trouble. This included virtual therapy sessions as well as the problem gambling subreddit, whose members were available whenever he needed their support. Now, he uses social media platforms like LinkedIn, Instagram, YouTube to broadcast his message worldwide.

That brings us to the third in our series of op-eds, prepared by Dr. Tiange (Patrick) Xu, a Postdoctoral Researcher at the International Gaming Institute, University of Nevada, Las Vegas. Dr. Xu will offer two perspectives: first, that of a gambling researcher mindful of the harms inherent in digitally-delivered gambling opportunities and gambling "adjacent" activities such as cryptocurrency trading (especially so, given his own research revealing the high prevalence of gambling-related harm among crypto traders), and second, as someone who at one point became so obsessive about his own crypto trading that he experienced some of the classic signs of addiction. Both perspectives have given Dr. Xu an appreciation for how much more we need to learn about the risks associated with these technologies and how to mitigate them.

Dr. Molly Maloney and Dr. Jennifer Merrill, both of Brown University, will return us to the topic of digital interventions for addiction in the fourth Special Series op-ed. Drs. Maloney and Merrill will highlight access as a (mostly beneficial) feature of new technologies – as when digital data collection gives researchers access to study participants' fleeting thoughts and feelings, or when, during the COVID pandemic, videoconferencing gave patients better access to addiction therapy. Drs. Maloney and Merrill invite the reader to imagine a future in which healthcare providers use passive sensing technology, such as transdermal alcohol data or heart rate variability, to understand when and how to support particular patients in their recovery journeys. At the same time, they call upon researchers and healthcare providers to be ever vigilant about ethical considerations – for example, by considering increased access to individuals' thoughts, feelings, and behaviors to be a privilege that must never be taken lightly or misused.

In addition to these excellent op-eds, we will provide, over the course of this month, four science reviews on the intersection between addiction and technology. Stay tuned to learn more about telehealth and text-based interventions for at-risk drinkers, using AI-based chatbots to promote smoking cessation, digital detection of risk factors for return-to-use, and the experiences of young adults who regularly view gambling livestreams.

In *The Demon-Haunted World: Science as a Candle in the Dark*, Carl Sagan and Ann Druyan wrote that skepticism and wonder are "the two uneasily cohabiting modes of thought" central to the scientific method. Following their lead, I suggest that we approach scientific questions about technology and addiction with a mix of skepticism and wonder. We can allow ourselves to be optimistic about the use of new technologies to help people avoid harm from addiction in previously unimaginable ways, while remaining vigilant about potential harms, especially to those who are most vulnerable.

We hope you will enjoy and learn from this Special Series.

– Heather Gray, PhD, Director of Academic Affairs, Division on Addiction at Cambridge Health Alliance, a Harvard Medical School teaching hospital

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