THE BIG RESET:

Why COVID-19 presents a blue moon moment for mental health technology.

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TABLE of CONTENTS

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Brett Atwood
VP, Ventures at United Health Group R&D

Walter Greenleaf
Behavioral Neuroscientist and Medical Technology Developer, Stanford University

David Kessler
Professor of Primary Care, Bristol University

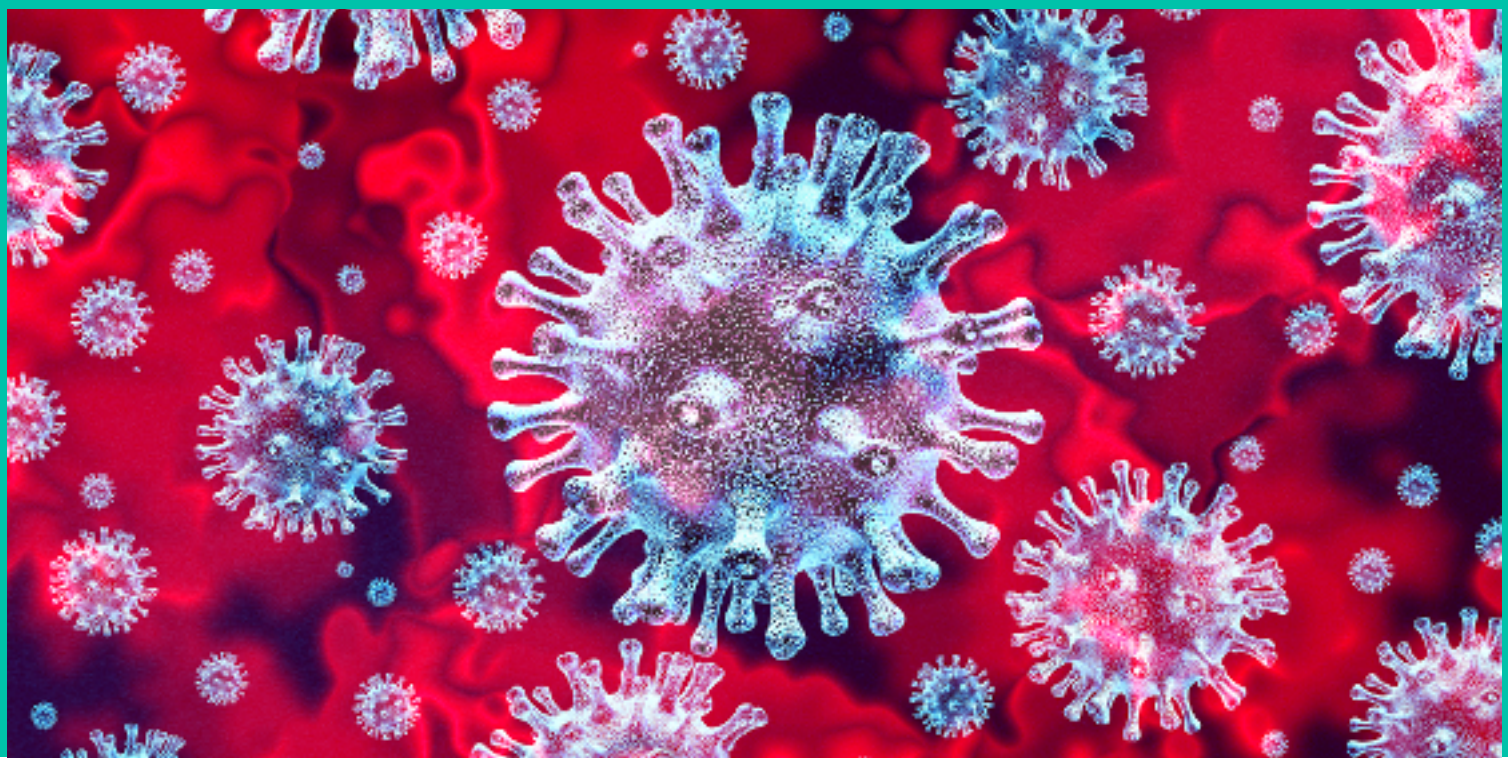
Samuel Nordberg
Chief of Behavioral Health at Reliant Medical Group

Skip Rizzo
Director for Medical VR at The University of Southern California's Institute for Creative Technologies

Matt Vogl
Executive Director at National Mental Health Innovation Center

"VR therapy has the capacity to revolutionize the mental healthcare experience for patients."

BARNABY PERKS
CO-FOUNDING CEO,
OXFORD VR



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SECTION 1 INTRODUCTION

THE COVID-19 MENTAL HEALTH EMERGENCY DEMANDS A BRAVE RESPONSE.

COVID-19 has put future mental healthcare provision firmly in the spotlight. Healthcare systems across the world are experiencing huge surges in demand.

There are the obvious acute mental-health issues: anxiety from job losses, business closures; stress from health concerns and traumatic experiences of bereavement, and depression, fuelled by isolation, loneliness, panic, and fear. But what about the impact on mental healthcare in the aftermath and, in the long term? It's reasonable to anticipate a rippling effect on future capacity in mental healthcare systems around the world.

In a matter of days, telecare connected providers with patients in Europe and the United States. In order to continue this telemedicine revolution into the new normal, critical new thinking is required to ensure the right technologies are adopted.

In this position paper we have gathered views from some of the most respected leaders and thinkers in healthcare, behavioral health and teletherapy, and share their perspectives on the critical issues - the challenges ahead, and the opportunities emerging in the new mental healthcare landscape.

BARNABY PERKS
CO-FOUNDING CEO
OXFORD VR

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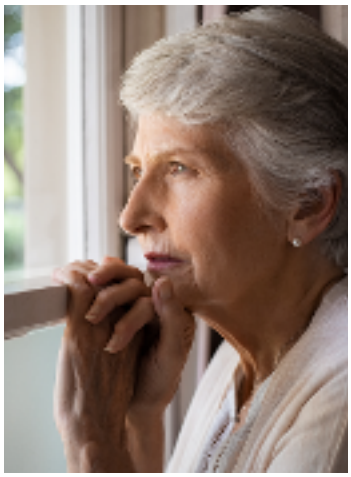
SECTION 2

COVID-19 HAS ESCALATED THE GLOBAL MENTAL HEALTH CRISIS.

Two of the groups that are likely to be most affected by the pandemic in the short term include healthcare workers and survivors of COVID-19.

As healthcare workers return home after weeks or months of long, stressful hours risking their lives due to the shortage of PPE, and as patients struggle to return to a normal life after staring death in the face, they will need help. Many will suffer from post-traumatic stress disorder (PTSD). Many already are. They won't be alone. Relatives of these groups, workers who have lost their jobs and seen their businesses and even entire industries collapse, and those people with pre-existing anxiety disorders, depressive disorders, and substance use disorders will also suffer. Anyone experiencing one or more of a whole host of healthcare issues that were being treated prior to COVID-19 that are not being treated in the same way today because of the focus on COVID-19 may also experience difficulties.

The pandemic has escalated a global mental health crisis. Matt Vogl, Executive Director of the US National Mental Health Innovation Center, says, "We're at the beginning of what will absolutely be the biggest mental health crisis of our lifetimes, possibly in modern history, in terms of people affected both short and long-term. When you add in unemployment , you start to have a recipe for high suicide rates among working-age men. You're also going to have a huge impact long-term on



the kids who are going through this now—high school and young college students especially. Younger kids tend to be more resilient, but we're going to see skyrocketing rates of PTSD, of depression, anxiety, and those are going to, in many cases, linger."

Samuel Nordberg, Chief of Behavioral Health at Reliant Medical Group, has already seen "a short-term uptick" in mental health issues. "People with anxiety are experiencing more symptoms, people with substance use disorders are engaging in more of the substance use, and people with depressive disorders are starting to experience the impact of isolation from quarantine. It's so hard to predict whether this is a sea change or whether this is going to be a blip that'll be largely resolved a year from now."

Skip Rizzo, Director of Medical Virtual Reality at the University of Southern California's Institute for Creative Technologies, pointed out a survey in March of more than 700 COVID-19 survivors in Wuhan, as part of the first study to examine the prevalence of post-traumatic stress symptoms in COVID-19 patients. Based on a questionnaire, the researchers found that 96.2% of the patients showed "significant post-traumatic stress symptoms."

Another expert predicts that COVID-19 is going to produce "a tsunami of mental health needs" that will cause "traffic jams in the system" once the virus is under control. "There's going to be a rush of demand to not only catch up with the new needs arising out of the pandemic, particularly for mental health, but the rush of demand to catch up with care that's been deferred too".

Walter Greenleaf, Behavioral Neuroscientist and Medical Technology Developer at Stanford University, agrees that this is an unprecedented time in terms of mental health needs. "It would be easier to list those that don't need help right now," he says. "Even pre-COVID, there were delays in getting mental healthcare in the United States. Often, patients with addictions, depression and anxiety disorders, were forced to delay care for months while waiting for appointments." "Telemedicine", says Greenleaf, "may eventually be able to provide the tools to address this backup."

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SECTION 3

TELEMEDICINE ACCELERATION AND ADOPTION.

Almost overnight, telemedicine has surged in importance for patients unable, to meet providers at offices, clinics, or hospitals, due to quarantining, fear or closures.

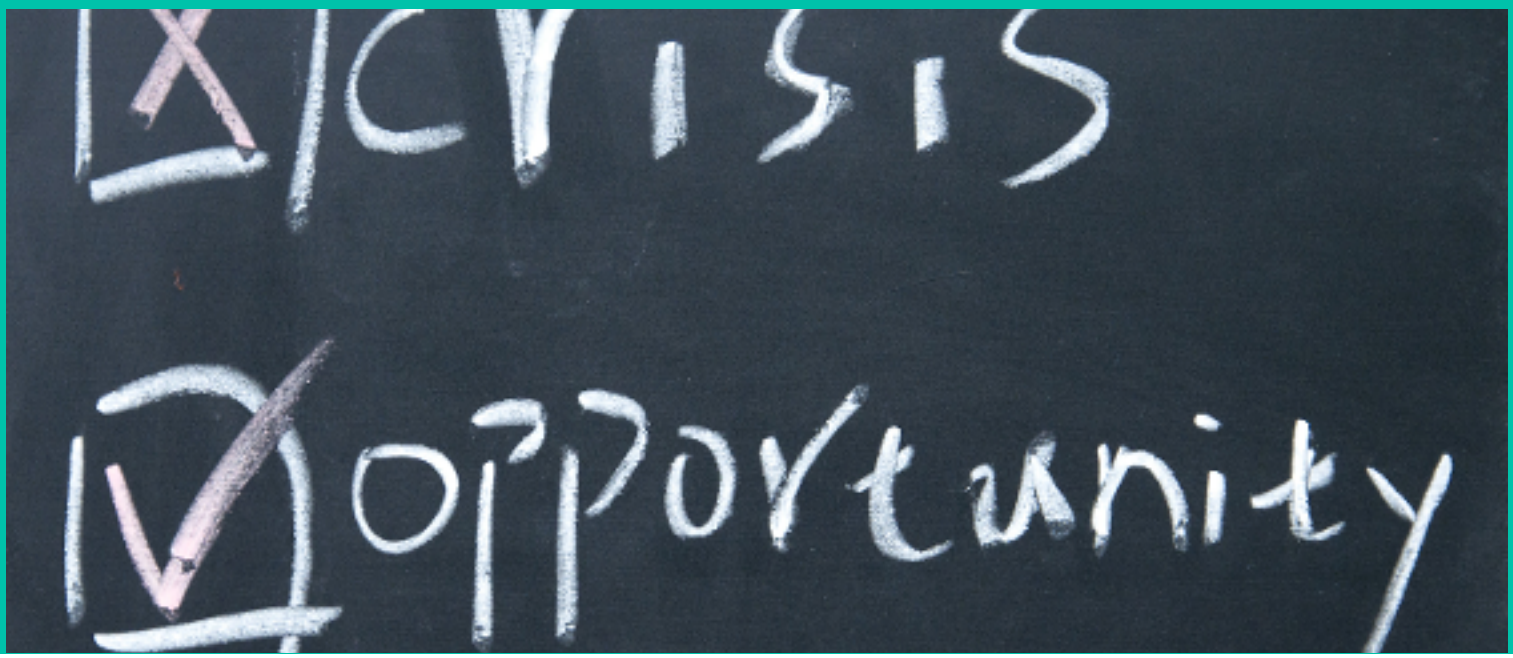
According to CNBC.com, "there could be nearly 1 BN coronavirus-related virtual visits" in 2020 alone. The same report cited research from March showing how telehealth visits had increased by 50 percent.

Coronavirus has already catalyzed what many organizations and individuals in healthcare have been putting off for years, according to Samuel Nordberg. "All of a sudden, the entire industry is on video," he says. "We shifted my entire department of 70 clinicians onto video in 48 hours and I don't think that we will go back to a full bricks and mortar model after this." Some of the biggest naysayers and skeptics of telehealth in the medical field are now being forced to try it, or else lose all or nearly all of their patients.

Anecdotally, the feedback from patients and providers has been positive, says Brett Atwood, Vice President of Ventures at United Health Group R&D. One large provider he works with converted all their appointments to telephone or virtual visits in just two days. No-show rates at the same provider have dropped by half, at least partially due to the ease of opening up a laptop or picking up a phone versus driving to an office.

Transportation and childcare are real barriers to healthcare for many patients, and telemedicine can help with that. It can be, as one expert put it, "a great leveler in terms of addressing some of the social determinants and factors that contribute to therapy in an office not reaching lower socioeconomic status patients." Atwood mentioned the case of a patient who suffers from depression and chronic pain. She said she would have missed her appointment had it been at the clinic, but since she could do it without leaving her bed, she was able to be seen by a doctor.

With telemedicine, doctors and nurses are also able see a patient's home, and observe if it's a healthy environment. They can ask to see a patient's medicine cabinets, which makes it easier to tell the patient what to keep and what to throw out. "It's a very powerful medium and we're still just learning what are the things about it that are the most helpful for treatment," says Nordberg. "One of the real challenges will be figuring out how we tune the model so that we're giving patients the right modality of treatment based on what it is that they need. That'll take us time to figure out."



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SECTION 4

THE CHALLENGES AND OPPORTUNITIES FOR DIGITAL MENTAL HEALTH CARE PROVIDERS.

If telemedicine is going to continue to expand and become a more everyday part of healthcare in general, there will be a range of challenges for providers.

David Kessler, Professor of Primary Care at Bristol University and a GP also trained in psychiatry, says that "one major challenge is going to be the capacity of people with mental health problems to use online technology. Many patients do not have the ability to use newer technology, nor the financial resources to obtain computers or good broadband service. Patients in more rural areas may lack access to fast internet as well. It could facilitate a two-tier system where higher functioning or wealthier patients get better service."

There will also be issues with data governance and privacy, according to Barnaby Perks, Co-founder & CEO of Oxford VR. "When you're practising in the home, you still have to collect outcomes data and process recordings of transcripts," he says. "There are ways of doing it that are secure, but these are systems that need to be put in place."

Other practical issues that could come up include what most people are experiencing right now. Therapists working from home have to deal with children and pets running around in the background of a Zoom appointment. With many patients no longer bound by regular 9-5 working hours, they may come to prefer appointments outside of those hours, which will require a shift in behavior for therapists.

Providers will have to determine which patients should be treated remotely and which will benefit more from in-person treatment.

That will require learning how to distinguish between those patients, "rather than simply having it be a matter of preference or convenience," says Nordberg. "That could take years of honing before a proper process, and balance, is found." And while healthcare providers are seeing the benefits of telemedicine; more independence, not having to pay for office space, they may lose out on what makes a group practice valuable, such as professional development, and having colleagues nearby when stress is high. Says Matt Vogl, "We're going to have to figure out how to build support networks and learning mechanisms so that mental health providers continue to grow in their profession and their knowledge of the field of mental health."

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SECTION 5

VR THERAPY'S ROLE IN THE NEW DIGITAL HEALTHCARE ECOSYSTEM.

The coronavirus pandemic has caused a unique worldwide reaction; billions of people have been forced to stay at home, or are willingly self-quarantining, rarely venturing outside.

Aside from the innumerable impacts this is having on our relationships, parenting, schooling, and the economy, quarantining is also affecting our healthcare options. But quarantine doesn't mean patients can't *experience* the outside world. Virtual reality therapy can help with that, though it too, comes with new challenges for providers and patients.

"One of the things that's most compelling about VR therapy is its ability to help a patient escape, or immerse themselves in a different environment, if their environment is part of what's contributing to their symptoms," says Samuel Nordberg. "Think about a patient who's cooped up in a small apartment and they haven't left that small apartment in three weeks, except to get some groceries."

VR therapy can help take the patient away from their home for a period of time, and bring them to a beach or garden, all while potentially training them in the skills that they need in order to cope with their current situation—whether it be dealing with claustrophobia, fear of heights, or other ailments. When the world is chaotic, as it is now more than ever, or even in lockdown, VR therapy can be an escape.

VR therapy also makes it easier for patients to practise what they've learned with their therapists in-between sessions, by entering into simulated real-life situations in safe, immersive virtual environments, all while still in the comfort of their homes.

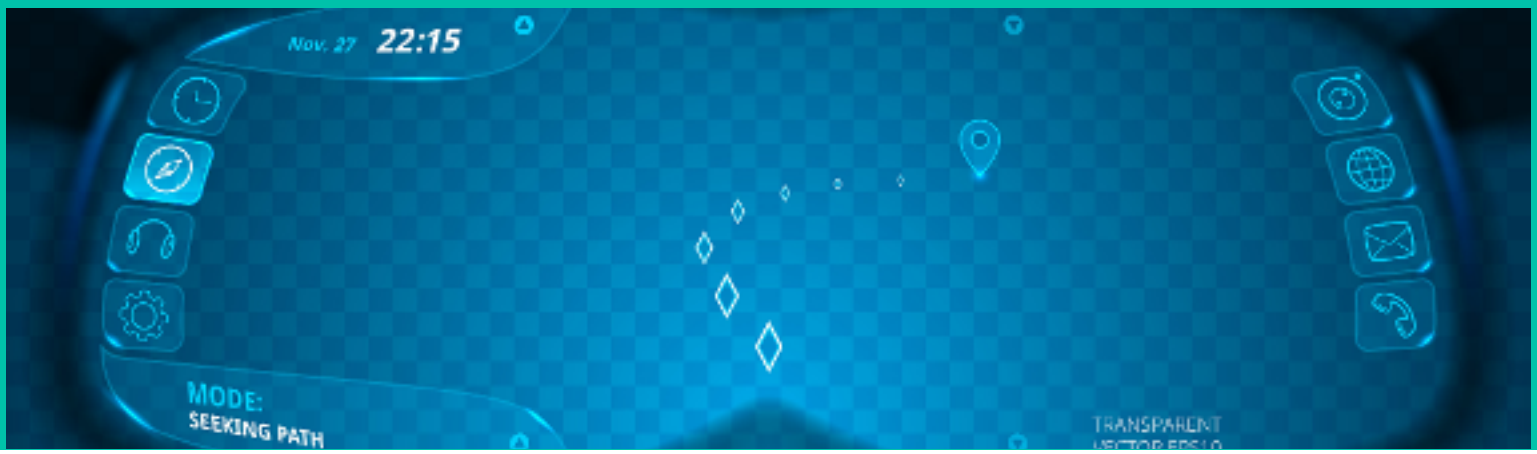
Barriers to widespread VR therapy adoption

But if VR therapy is going to expand during a time when most patients cannot leave their homes, or in the future when an increasing number of patients will prefer not to, there is still work to do for providers to make VR therapy widely available.

Skip Rizzo says that "after 25 years of VR research, it has only recently become technologically feasible to deliver VR remotely to patients." He believes there will soon be a massive boost in standalone, all-in-one VR headsets. But socioeconomics, again, are a substantial barrier.

Right now, VR therapy is generally practised in the office, guided by healthcare experts. Patients will need headsets in the home if therapy is going to be practised there. And though devices are getting less expensive every year, perhaps those in the middle and upper classes can afford to own their own VR headset, but the same may not be said for those patients who are worse off financially. And there is no guarantee that insurance will cover a potentially expensive device.

VR therapy can also require great amounts of bandwidth, and there is no guarantee that patients in remote regions, or patients with lower incomes, will have fast enough internet service to run the highest quality VR programs. Oxford VR, for one example, has focused on high-end headsets that are tethered to a gaming computer with a powerful graphics card. Since the onset of the crisis, the business, which is a spin-out from Oxford University, has also been gearing up to deliver VR therapy treatments and programs in patients' homes.



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Even if there is a way to distribute headsets to patients using a loan-based system, during a pandemic where virus can spread by touch, people may not want to share gear that has touched the face of other patients. "Headset manufacturers didn't build headsets with a viral pandemic in mind, so they're not easy to sterilize", says Matt Vogl. "We in the field have been saying for awhile that for hospital settings you need these tools to be able to be rapidly sterilized without destroying them. But there hasn't been much movement on the part of the headset manufacturers," he says. "So there's going to have to be some pretty big changes made on the part of the industry."

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SECTION 6

ENSURING ADOPTION OF EVIDENCE-BASED SOLUTIONS.

Because of the suddenness of the pandemic, there is likely going to be an initial, desperate push to put teletherapy programs into patient's hands.

But eventually, the research world will need to study these programs and do more traditional randomized controlled trials in order to formally establish effectiveness. That kind of work takes time and research collaboration.

For example, if you look at the app store on your phone, you will find endless numbers of apps that you can download for free, or for a few dollars, that claim to be useful for addressing your fears or treating your psychosis. "A lot of them are just packed together by people whose background is in gaming or app development," says Walter Greenleaf. "But they don't understand medicine."

"Consumers by and large don't have the savvy to look at three studies and say, 'Yes, this one sucks and these two were well conducted,'" says Matt Vogl. "As consumers, we rely on federal regulatory agencies like the FDA or the FCC to ensure that the messages that these companies are giving us are in fact accurate and the things that we're buying, do what they claim to do. There's definitely a need to educate the public and to really understand what evidence-based means because it can mean a lot of different things."

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"There's a great danger that you just bring things to the home that really aren't based on any evidence at all and not based on any scientific principles, just because it's easy to do," says Barnaby Perks, who contrasts that hastiness with the work being done at his company. "The focus at Oxford VR is to try and establish where the evidence lies in the different treatments and programs that we're deploying through VR. And to use VR as a way of delivering evidence-based therapeutic techniques that are already used in the face-to-face environment."

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SECTION 7

REGULATION WILL NEED TO KEEP PACE WITH THE NEW NORMAL.

With telemedicine becoming an urgent, expansive need during the coronavirus pandemic, U.S. regulatory bodies and insurance companies have immediately changed rules on payment for such services, and some states have eased rules on practicing across state

For example, pre-COVID, many insurance companies might not allow a provider to bill for a therapy session conducted at the home, even if the services provided were identical to those provided in the office. Or, a therapist based in Massachusetts may be prevented from seeing a patient who is at home in Rhode Island, just a few miles away. But now, many (though far from all) of those barriers have dropped, at least temporarily.

"People have been lobbying for regulatory changes in telemedicine for years and then it just happened overnight" says Matt Vogl. But, he adds, "you don't want it to become the wild west. No rules is just as bad as too many rules. The regulatory system should become easier to navigate for tele-medicine, and the approval process for new devices and therapies should become less time- and resource-intensive. But effective safeguards need to remain in place. In order to get there, there will need to be pressure from the entire medical ecosystem: from patients, providers, tech companies, and

insurance companies.

There will have to be a push for national licensing standards for practicing medicine, as opposed to just the current system of varying standards

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Some states have formed alliances during the pandemic, but not all, and there is worry that state licensing boards will try to reassert their guardianship of the process if and when the pandemic wanes. One expert believes there will be a push to maintain state alliances and an eventual push for national licensing standards. But this could take years to iron out. "Once the novel coronavirus pandemic ends, whenever that is, and the governors relax these temporary lifting of licensing requirements, I think we'll see things snap back for a while," says Samuel Nordberg. "But we'll absolutely also see in this the genesis of a movement to change the way we license and permission people to practice."

"Patients have learned they can have a conversation with their clinicians and get help without having to drive and wait in line and be at a clinic," says Walter Greenleaf. "Some things will always need to be done in person, but a large part of care, including in the mental health arena, could be done through video conferencing. And it's not just video conferencing, we have wearable sensor technology now. We have machine-learning analytics. We have very powerful AR and VR environments that can be used as effective treatment tools. So, I don't think we'll go backwards. I think it's going to be hard to put the toothpaste back into the tube."

"Generally, the waivers that you've seen around telemedicine will have to, in some form, be maintained. We've got to get to a place where evidence-based therapies can be administered and paid for outside of the clinic setting," says Brett Atwood.The regulatory allowance of, and support of, telemedicine and remote therapies like VR are going to be critical to ensuring that these tools can be used in a useful and impactful way post-COVID."