Gradually, then suddenly

The time is right for the third generation of digital health

The technology is ready, the regulatory context is becoming clearer, and – accelerated by pandemic-driven paradigm shifts – both patients and physicians appear eager. The third generation of digital health is with us, bringing transformational digital medicine and therapeutics. And unlike earlier technological advances, this time Latin America seems just as prepared as anywhere else. Get to know the next generation.

In 1995, dermatologist Dr Joseph Kvedar started a revolution – albeit a slow-burning one. He led a program at Massachusetts General Hospital in

Boston focused on the development and application of technology to deliver care outside of a hospital or doctor's surgery. Dr Kvedar turned into one of the fiercest advocates for what became known as digital health, defined by the US Food and Drug Administration (FDA) as technology that uses "computing platforms, connectivity, software, and sensors for health care and related uses", including, "mobile health, health information technology, wearable devices, telehealth, telemedicine and personalized medicine".

Nearly 30 years later, and, in Dr Kvedar's words, "Our time to shine is now". In 2017 the FDA developed its Digital Health Innovation Action Plan, and three years later created a Digital Health Center of Excellence. A 2018 IQVIA study counted over 318,000 different health-related digital applications available to customers, with 200 new ones being added every day. Use of telemedicine doubled among US physicians between 2016 and 2019, according to an American Medical Association survey. That is to say that even before the Covid-19 pandemic struck, there was a steady advance by both physicians and patients towards adoption of digital health solutions.

As with many other areas of technology adoption, the pandemic catalyzed "steady advance" to "dramatic shift" (see Axenya article 'Not in Kansas anymore: What will the "new normal" really mean for digital medicine?'). 60% of early adopters and 40% of late adopters say that the pandemic caused them to buy or try a technology they hadn't used before, and this appears to be as true in health as anywhere else. The percentage of US consumers who saw a doctor or sought medical help online rose almost fourfold between the end of 2019 and May 2020, accompanied by a rise in patients managing prescription medicines online or using some kind of healthcare app. A McKinsey survey carried out in May 2020 showed a shift from an 11% use of telehealth pre-pandemic to fully 76% of patients interested in using telehealth going forward.

Perhaps most excitingly, this new confidence and interest in digital health has prepared the way for adoption of third generation digital health. While first generation products consisted mainly of consumer-facing apps dealing with exercise, wellness or nutrition, and the second generation was focused on generating efficiency in administrative tasks in the doctor's surgery or hospital, third generation products and services have vastly more potential to impact on patients' lives, as functionalities improve by quantum steps. They include health applications that qualify as fully-fledged therapeutic products. In 2019 the FDA created the Prescription Digital Therapeutics category, digital health

products that are supported by outcomes research and require medical prescription. By the end of 2020, five products had achieved FDA clearance.

According to the Digital Therapeutics Alliance (DTA), formed in 2017 to give guidance and credibility to a nascent industry, digital therapeutics "deliver evidence-based therapeutic interventions that are driven by high quality software programs to prevent, manage, or treat a medical disorder or disease. They are used independently or in concert with medications, devices, or other therapies to optimize patient care and health outcomes." According to the DTA, to be considered as such, digital therapeutics need to, among other things, publish clinical trial results in peer-reviewed journals, collect and apply real-world evidence, and be reviewed and cleared or certified by regulatory bodies. In this sense, they are far more similar to "traditional" pharmaceuticals than to the wellbeing apps that preceded them.

Digital therapeutics are varied. They often work with chronic illness or neurological disorders, conditions poorly served by sick-care focused health systems, with Diabetes, obesity, chronic obstructive pulmonary disorder (COPD), developmental disorders and post-traumatic stress disorder (PTSD) among the conditions targeted. They often use a combination of remote monitoring and behavioral therapies to help patients make wise, data-driven choices to better manage their illness. The FDA's first clearance for a digital therapeutic for disease treatment was Pear Therapeutics' reSET program for patients with substance use disorder; other high-profile products include virtual reality scenarios to help patients with psychosis (GameChange), and a 'social robot' that encourages patient engagement (Mabu).

But while some of these sound more like episodes of Black Mirror than real life, critically to the definition of digital therapeutics, there is evidence that they work. The reSET program showed abstinence in 40% of patients using its application for 3 months, compared with 17.6% of those who used standard therapy alone. The Mabu social robot is based on research at Boston University Medical Center that demonstrates that robots are more effective than apps at keeping patients engaged long-term. The clinical effectiveness of the GameChange VR therapy is currently being tested in a randomized controlled trial with several hundred patients.

And the potential is huge. This third generation may represent 80% of total digital health value, according to a study by Bain and Co. The value of the global digital therapeutics market was estimated at USD 1.8 billion in 2018, and

was expected (pre-pandemic) to reach USD 7.1 billion by 2025.

A big question has been what, if any, regulatory approval should be required for these new products. How to square the rigorous regulatory process required for any product making serious medical claims with the fast-moving technology behind digital therapeutics? The FDA has proactively looked for a solution to the puzzle with its Digital Health Software Pre Certification Pilot Program, intended as a way to offer oversight to what the administration refers to as Software as a Medical Device in a more flexible and continuous way, appropriate for a continually iterating product.

The FDA appeared to confirm its commitment to digital therapeutics by relaxing some regulatory requirements to address particular health problems aggravated by the pandemic and its immediate consequences. For example, it has temporarily expanded patient access to digital therapeutics for psychiatric disorders, and allowed limited modifications to certain remote monitoring devices used by chronic disease sufferers.

So, the technology is there, patients are interested, regulatory hurdles are being overcome. But what of health care providers themselves? Physicians hold the key to the success of digital therapeutics in more ways than one. It is the doctor who will need to recommend the most appropriate digital solution for each patient, based on a profound understanding of their condition and situation. The doctor will need to advise on the correct usage of the application, to promote adherence, and to use the product to draw better conclusions and make better decisions – and thus provide better patient care. Moreover, many therapeutics will need physician prescription. For this to happen, they will need to be straightforward to use and explain to patients, to add value without further complicating physicians' lives, and to integrate easily into their workflows.

Health care practitioners, often branded as technological laggards, are showing ever greater interest in digital health. A mid-2020 McKinsey survey of US-based physicians discovered that 64% viewed telehealth more favorably than they had done before the pandemic, and that 57% felt more comfortable with providing it. Even before the pandemic, a 2019 American Medical Association (AMA) study found that 87% of physicians believe that digital health will offer some or a definite advantage to the care that they are able to provide for their patients. And this interest is translating into action. The 2020 IPSOS Digital Doctor report estimates that, worldwide, 46% of doctors have

recommended some form of digital health solution to their patients.

This may be the case in the US, Europe and China where adoption of new technologies tends to be swift, but what of Latin America? Although internet proliferation in Latin America is widespread and social media use among the world's highest, the region has been something of a late adopter in other areas. Pre-pandemic just 1 in 4 people in Latam were ecommerce users, as opposed to 60% in North America. Is it fair to expect that physicians in Sao Paolo will embrace technology with the same enthusiasm as those in New York or Beijing?

In fact, if recent research among Brazilian endocrinologists is to be believed, they're already doing it. The investigation, carried out during the pandemic, reveals that more than 70% of those interviewed use digital platforms to communicate with patients between appointments, and that 75%, 85% and 90% respectively said that they would be comfortable continuing to work with healthcare apps, telemedicine and Whatsapp with their patients post-pandemic.

If communication with patients is the "gateway drug" to technology for most physicians, what have they dabbled in outside of this? Many report recommending Patient Support Programs (PSPs) - services for chronic disease sufferers, that provide remote training, emotional and psychological support and telehealth - although most agreed that these programs fall short of providing a comprehensive solution for disease management. Many of those interviewed agreed that the use of smart devices with patients was a growing trend, qualifying that each case needed to be assessed to understand economic possibility and technological savviness.

When presented with a hypothetical digital therapeutic for their Diabetes patients, that aggregates and analyses data from multiple monitoring devices, highlights imminent problems and permits 24/7 communication, all accompanied by constant coaching support, the response was overwhelmingly positive. Over 90% of interviewees said that they would be interested in incorporating such a product in their daily practice, and over 85% claimed that they would recommend it to their patients. So much for the stereotype of the technology-averse physician. Interestingly, this hypothetical solution would also provide a solution for two of physicians' biggest concerns: firstly, how to monetize the communication and enquiries that take place outside of the doctor's surgery, through digital channels. And secondly, how to educate their patients on correct application of insulin and the impact of

their diet and lifestyle on the evolution of their disease.

The arrival of the third generation of digital health in many ways has been slow. Over the last decades since Dr Kvedar's program began, the technology has been lacking, the health system unprepared, both patients and physicians culturally at odds with the concept. But slowly but surely, that has been changing, given a push this last year by the pandemic-driven digital surge. In Hemingway's words, it has happened "gradually, then suddenly". It's hard not to agree with Dr Kvedar that, finally, "our time is now".