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DIGITAL THERAPEUTICS (DTX): PROMISES AND CHALLENGES

Digital therapeutics (DTx) have the potential to revolutionize the health care industry. But what can be classified as DTx? What kinds of standards do they have to meet? How do they vary by country, and how are governments enforcing these standards? Here, we define this new frontier of healthcare, including its origins, its current state and its possible future.

What are Digital Therapeutics?

Software interventions through the internet have existed since the beginning of the century.[i] Digital Therapeutics (DTx) build on these, using combinations of software, secure data syncing, and AI to deliver evidence-based therapeutic interventions in the treatment or management of a disease or disorder.[ii] Perhaps most importantly, DTx require review and approval by a regulatory body, just like any medication or medical device. The potential of DTx to be widely and easily accessible has been explored more and more in-depth with the increasing ubiquity of smartphones over the past several years. With the rise of DTx accessibility, the importance of increasingly high standards and regulations has also become clear.

What kinds of standards do DTx have to meet?

As mentioned above, DTx are kept to the same strict standards as any other medical intervention, pharmacological or otherwise. Many countries have enacted legislation to develop regulatory categories for all Digital Health technologies. They must undergo extensive clinical testing, often including randomized controlled trials, and must demonstrate safety, efficacy, quality, patient centricity, privacy, and ongoing clinical impact.[iii]

Across Europe, all DTx products follow medical device regulations,[iv] so they must have a CE marking, which indicates that it meets EU health, safety, and environmental standards, and they must also comply with GDPR data security requirements. Since January 2022, in most of the UK, they must have the UKCA marking as an alternative (or in addition) to the CE.[v] Each country has its own additional regulatory body that must approve DTx; for example, in Germany, it must meet the standards of the Federal Institute for Drugs and Medical Devices (BfArM).[vi] In France, they must be approved by a national committee for evaluating medical devices and health technology (CNEDiMTS) and they must meet data security requirements in addition to the GDPR.[vii] In the UK, they must meet Digital Technology Assessment criteria

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defined by the NHS.[viii] In addition, the National Institute for Health and Care Excellence (NICE) has defined an evidence standards framework for assessing DTx.[ix]

Germany has led the pack in enacting government policies for encouraging development and innovation of Digital Health Applications (the German acronym is DiGA). In 2019, Germany approved the Digital Healthcare Act, allowing a fast-track for apps to be approved for prescription by physicians or psychotherapists.[x] These apps must still meet high standards of clinical safety and efficacy – to be approved, the state of a patient's health or capacity for dealing with the disease or medical condition must be improved through the use of the DiGA.

Although there is no general process for reimbursement yet, France is working toward a similar system; the 2018 Article 51 from the French Health Ministry introduced the goal of reorganizing the way health care is funded and reimbursed in order to optimize it based on present technology and infrastructures, and also to encourage experimentation and innovation. Targeter innovation funding is available for pre-clinical trial projects that demonstrate high potential,[xi] and the government anticipates a list of reimbursed software by the end of 2022.[xii] In the UK, the NHS plans to recommend apps directly on their website, but this is not yet in place.[xiii]

Within Europe, the first DTx to have its costs reimbursed by a government, in June of 2020, is Moovcare, a French-Israeli company that accompanies lung cancer patients on their health care journeys. Through daily symptom reports by the patient, Moovcare alerts the medical team when their intervention is needed. In a clinical trial, it improved cancer patient survival by over 7.6 months relative to controls, as well as improving their quality of life.[xiv] Since then, governments have been working quickly to approve others; Germany currently has 28 DiGA listed in its guide, for treating medical concerns and diseases such as depression, stress and burnout, multiple sclerosis, panic attacks and phobias, among others.

What other kinds of DTx already exist?

The US was the first big market for digital health interventions, before any framework for approval existed. WellDoc's DiabetesManager system was one of the first, receiving FDA approval in 2010. Livongo is another early example – its diabetes monitoring program was released in 2014 and combined a connected blood glucose monitor with an app and Certified Diabetes Educators. Its initial market was other businesses, that is, employers and insurance companies. Livongo was acquired by telehealth giant Teladoc in 2020 in one of the biggest mergers of the year, but it is not yet clear what impact this combination will have on the

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market.[xv] In 2017, Pear Therapeutics' product reSET®, which makes use of CBT (Cognitive Behavioral Therapy) techniques along with a contingency management system for treating Substance Use Disorder, was the first DTx to receive authorization from the FDA to improve disease outcomes.[xvi] In 2020, the FDA approved its first prescription video game, EndeavorRx by Akili Interactive, which aims to improve attention in children with ADHD.[xvii] To keep up with this growing demand, the FDA has introduced a Digital Health Center of Excellence which provides support and networks for patients, health care providers, DTx developers, researchers, payers, and regulatory bodies, among others. They are working to increase digital health expertise at the government level, modernize policies, and create a pre-certification pathway for DTx, perhaps following in Germany's footsteps.[xviii]

Some makers of particularly creative DTx products on the market include Propeller Health, which has developed a way to connect asthma inhalers to smartphones, combining medication data with air quality to reduce flare-ups; Cognoa, which facilitates earlier diagnosis of autism and navigating the transition from diagnosis to finding appropriate behavioral health care and support, and Luminopia, which improves vision in children with amblyopia using modified TV shows and a virtual reality headset.[xix]

DTx products can address various mental and physical health problems. A large number of these interventions are based on techniques from Cognitive Behavioral Therapy (CBT), which was a groundbreaking therapy in its own right. Its founder, Dr. Aaron Beck, was one of the first to apply medical evaluation techniques such as randomized clinical trials to psychotherapy.[xx] CBT has since been validated as an effective therapy in numerous studies, and can be practiced from a distance, making it ideal for adaptation/ incorporation into new DTx interventions.

In sum, chronic health problems requiring regular medication or other treatments are the ideal market for DTx, including cancer monitoring and preventing post-op complications; diet and exercise monitoring for weight loss, high cholesterol, hypertension, or type 2 diabetes; and pain management. Mental health is no exception: in addition to providing support for conquering addictions, DTx can help patients deal with depression and anxiety and even support holistic treatments for problems like insomnia. It could be used for screening in at-risk populations, such as for postpartum depression among new parents. For patients with multiple or complex conditions, digital support may be essential for coordination of their health care team. Coordination of this nature could reduce the burden on hospital administration while improving patient outcomes.

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Potential and Challenges

Digital Therapeutics offer great potential to change the healthcare landscape for the better.

They are scalable – Given the prevalence of smartphones and increasing general familiarity with connected devices and apps, DTx could reach a substantial market.

They reduce costs – By improving patient care and reducing complications as well as hospitalizations, healthcare costs could be dramatically reduced.

They can improve outcomes – Adherence could be improved, supported by frequent reminders of the why, how and what of the patient's treatment. In addition, this more regular monitoring can also help alert physicians to crises in a timely manner, allowing them to intervene before more serious complications arise. This is especially important for patients in rural settings. DTx can provide a crucial link between patients and physicians in underserved regions. Another major way that DTx can improve outcomes is by facilitating the diagnostic process, especially for rarer conditions – the structure and vast database of the AI algorithm can fill in gaps in physician knowledge.

However, as relatively new arrival on the healthcare scene, DTx also prevent a few challenges. At the time of writing this article, usage rates for DTx in the EU are low, indicating that either the right connections have not been made between the right DTx and the patient who needs it, or there is a fundamental flaw in the system that needs to be fixed before wide adoption. Below are a few of the current challenges:

Reaching later adopters – The part of the population that tends to be early adopters of new technology will quickly embrace DTx, but the rest may need some convincing. And, in all likelihood, it must be the health care providers who choose to adopt the technology first, before they will consent to use it with patients. Along these same lines, certain pathologies may be more adapted**.** Patients suffering from more acute conditions (e.g., cancer treatment), or who have been chronically ill for longer may be more likely to adopt a DTx than less severely affected patients (e.g., early-stage type 2 diabetes).

Engagement – The DTx must be adapted to local cultures and it must be user friendly, or people will not use it consistently. For example, to distribute a DTx throughout the EU, it must be robust and flexible enough to adapt to the different regulatory systems as well as the varying languages and cultures.

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Transparency and Reliability – The process by which DTx are assessed must be clear and it must demonstrate that they are required to meet strict standards. It is also important to be able to incorporate real-life patient experience and clinical outcomes measurements as the market progresses and more and more DTx are developed.

Keeping up – Another challenge for health care providers is the rapidly-changing landscape of DTx. Multiple countries have only recently entered the pilot/planning stage for standardized, streamlined regulation and reimbursement of DTx, or have only recently started to reimburse a very few specific apps. Policies like Germany's Digital Health Act and the DiGA database will help physicians be able to confidently prescribe appropriate DTx for their patients.

Conclusion

We are witnessing the birth of a promising new market with potential to revolutionize health care, reduce costs, and provide treatments for a selection of disorders with fewer side effects than many medications. Numerous countries have already implemented policy changes to streamline the adoption of Digital Therapeutics, and this work continues. The next steps in encouraging innovation, development and adoption of DTx include education for patients, prescribers and payers, increased standardization and transparency in approval processes, and user-friendly interfaces and catalogues of approved DTx like Germany's DiGA database.

Even though DTx are promising, there are numerous challenges that need to be addressed. The major one is low rates of usage, including both enrollment and engagement. They both require a good fit between the intervention and the patients' needs and wants, meaning that the designers of the DTx must have a clear understanding of patients' (i.e., users') physical and mental capabilities, needs, and desires. The intervention itself must be a result of agreements by all involved parties (patients, medical teams, payers, regulatory bodies, etc.). There is also the ever-present necessity of demonstrating a quantifiable clinical impact on outcomes. At Observia, we do not underestimate the potential of DTx – far from it – but we do consider them as one tool among many, including engagement programs and other e-health support solutions, that can be used to improve patients' lives.

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