
Advancing Decentralized Clinical Trials Through a Unified Approach to eCOA and Digital Health Technologies

Uniting Objective Technology-acquired Data with Subjective Clinical Outcomes Data Requires a Fresh Perspective

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Introduction

What are Digital Health Technologies? According to FDA, Digital Health Technologies (DHTs) are technologies that empower patients to innovatively monitor their health status/well-being and enable providers and other stakeholders to achieve efficiencies, expand access, reduce costs, increase quality and personalize treatments for patients (FDA: What is Digital Health?)¹. Examples include wearables, sensors, bluetooth-enabled devices, wireless medical devices, mobile applications, and telehealth solutions.

Drug developers are increasingly harnessing the combined power of objective data measured using digital health technologies (DHTs) and subjective clinical outcome assessments that include patient-reported outcomes (PROs). Uniting these two complementary mechanisms is enabling the development of comprehensive patient profiles that better inform how patients experience their disease and respond to treatment.

Combining these independent data streams significantly boosts the value demonstration of new drugs. Given the pervasive rise of drug development costs and increased time to market, bolstering value demonstration for marketed products is critical for attaining sustainable drug development and market access. In an environment where patient centricity and value demonstration are becoming a greater focus for stakeholders across the healthcare spectrum, the need to understand the 360 degree view of the patient, together with improvements in measuring patient outcomes, is critical to success.

Early planning for value evidence generation, including real-world effectiveness and differentiation in the marketplace, provides a unique opportunity for new and innovative treatments to achieve market access and to deliver greater patient accessibility to medicines. The goal of this paper is to provide a summary of the independent rise of DHTs and patient reported outcome data in clinical research, followed by a brief discussion of the combined benefits of pairing these two data streams to drive superior value demonstration.

Growth of Objective DHTs in Clinical Research

A confluence of factors has led to a dramatic rise in the adoption of DHTs in clinical research. This practice is projected to continue well into the future, with 70% of trials anticipated to use DHTs in the next few years (Myshko, 2019)². Some of the factors that have driven the increase in DHTs are as follows:

- Wider array of DHT options, such as wearables and other types of sensors, such as a bluetooth enabled thermometer or weight scale, that can generate, collect, and transmit an expanding range of high-velocity, high-volume measurements.
- Advancements in computing power and wireless technologies, such as the implementation of the Bluetooth® 5 standard with increased data transfer rates; data transfer from a DHT to a phone or hub to the cloud are now practical and faster than ever before.
- The ongoing COVID-19 pandemic turbocharged the demand for virtualization within trials.

¹ FDA: What is Digital Health? Available at: <https://www.fda.gov/medical-devices/digital-health-center-excellence/what-digital-health>

² Myshko, D. Wearables in Clinical Trials. PharmaVoice.com. March 2019. Available at: <https://www.pharmavoices.com/article/2019-03-wearables/>

With the increased backing by regulators and public-private partnerships, such as the Clinical Trials Transformation Initiative (CTTI), DHTs are well positioned to modernize the future of clinical research. DHTs have the potential to deliver a number of benefits for both patients and sponsors, including:

- ✓ Reducing patient and site burden
- ✓ Improving recruitment and retention efforts
- ✓ Allowing the collection of insightful longitudinal objective data (e.g., real-world evidence collected from patients in their natural environment)
- ✓ Supporting multiple types of measurements of patient data on their healthcare journey, including reliability in delivering medication, functional assessments, and diagnostics

Historically, a main challenge of utilizing DHTs within trials was a lack of well-developed standards or data mapping tools that would enable organization and standardization of the data. The ability to provide objective wearable data and subjective PRO data seamlessly unified with an electronic data capture (EDC) database is key to the success and implementation of any DHT within a clinical trial.

At the outset of using DHTs in a trial, attention should be paid to the selection of your device(s) and how it will be integrated with the overall data to support primary or secondary endpoints. Moreover, it is vital to ensure that the data are validated to maximize the quality of the evidence for presentation to regulators and payers.

Growth of Subjective Patient-Reported Outcomes in Clinical Research

Given that drug development programs have become more patient-centric over time, together with the need to show true clinical differentiation and cost effectiveness, the growth and value of PROs in clinical trials are not only increasingly accepted but are also becoming intrinsic when demonstrating value for patients, sponsors, regulators, and payers. This growth has largely evolved into a digital format, referred to as electronic patient-reported outcomes (ePROs). These tools capture the subjective experience from each patient throughout the course of a clinical trial, which are essential to the understanding of the patient's quality of life.

Subjective PRO data is now being used to develop primary endpoints for labeling, as well as confirmatory endpoints. The increasing use of ePROs is consistent with the overall application of more DHTs within clinical trials, as described above. Various major initiatives are seeking to standardize ePRO data, such as the collaboration between Medidata and Mapi Research Trust (MRT). Their goal is to standardize MRT's library of electronic Clinical Outcome Assessment (eCOA) questionnaires to create a clearinghouse of MRT's library of more than 470 eCOA forms and their respective translations, so the forms will not have to be custom made and retranslated for each use.

Clinical trials are being modernized by now combining complementary subjective PRO data with objective DHT data. These combined data streams are providing novel insights by yielding comprehensive patient profiles that were not readily obtainable in the past.

Merging Subjective PRO Data with Objective DHT Data to Enhance Value Demonstration

Merging subjective PRO data with objective DHT data is driving the value demonstration of new drugs by showcasing their real-world effectiveness and clinical differentiation. The collection of both subjective and objective patient data eliminates the burden on the patient to travel to the site, and provides a mechanism for consistent data collection with newly available data points for analysis. Furthermore, utilizing wearables in a phase II or Phase III study can help in the development of digital biomarkers. By combining patient reported outcomes together with the objective data from wearables and an understanding of specific digital biomarkers can help close the loop with the consideration of value demonstration.

Notably, objective parameters (which can be measured using DHTs) are correlated with the patient and caregiver feedback to develop meaningful and possibly predictive lines of evidence. This process means that patients are now providing continuous data feeds, which are often passively collected for the evaluation of a person's physical activity, movement, and vital signs, with additional measurements continually becoming available. The methods for DHT data collection can interact directly with devices such as smartphones via Bluetooth and, together with ePRO, can be transferred into a secure data storage containing other health-related information, where disease-specific algorithms can be applied.

Several commonly cited challenges need to be considered and overcome with consideration to clinical trials with multiple streams of both subjective and objective data. Such challenges include lack of interoperability between DHTs, data security and privacy concerns, and massive volumes of data, to name a few. These challenges are met head on with a unified platform that is scalable and secure, and provides effective and streamlined implementation and analysis of DHTs. Furthermore, the ability to ingest and standardize data from disparate devices is critical to establishing like-to-like comparisons even for data that may have used different DHTs with varying outputs.

Moreover, the most important aspect of any clinical study is ensuring patient safety. Utilizing ePRO data with wearable data can help clinicians monitor the patient's safety. The ability to standardize wearable data so that key data points can be analyzed together with PRO data, results in the ability for informed decisions to be made in real time, rather than waiting for a patient to come to the site. Enabling data collection remotely, together with the capabilities of a unified platform supported by Telemedicine, can aid in facilitating the required close interactions between clinician and patient.

By processing data streams through an innovative and secure platform designed to ingest data through a common data model, patient data can now be seamlessly visualized and analyzed in a unified way to drive the value demonstration of new therapeutics. The ability to provide these solutions within a unified platform not only enhances data integrity but maximizes efficiencies, increasing understanding and analysis of patient outcomes.

The availability of a unified platform solution provides the mechanism to achieve evidence generation utilizing various objective and subjective data streams at the patient level. Critical to this success is the understanding and collaboration with regulatory authorities. Designing protocols incorporating DHTs should be done so with the key considerations and implementation of regulatory requirements to ensure success.

Summary

Rapid progress has been made to incorporate DHTs into clinical research. By merging commonly collected subjective PRO data with objective DHT data, comprehensive patient profiles are being developed to drive value demonstration of new therapies. This novel approach has only recently become possible for a variety of reasons, including the emergence of novel software platforms that process data through a common data model to deliver outputs that simplify the processes to visualize and analyze patient data. There are discrete challenges to be overcome when seeking to integrate these data streams, but with some upfront planning, these can be circumvented to position new drugs for maximum success.

As the importance of value demonstration increases, the ability to develop robust and comprehensive data packages for regulators and payers, based on both objective and subjective input, provides the best opportunity for new drugs to win approval, gain patient access and generate the evidence required to differentiate therapeutics in the marketplace.

Medidata Sensor Cloud

Medidata Sensor Cloud provides cutting-edge capabilities focused on transforming the clinical trial experience for patients, sponsors, and research sites. Designed as part of a unified data platform, Sensor Cloud takes a unique approach to managing a broad range of wearable sensor and digital health technology data for clinical trials. Our common data model and proprietary algorithms enable rapid ingestion and analysis of patient data resulting in better clinical decision making, faster timelines and a more flexible patient experience.

To learn more about the Medidata Sensor Cloud, get in touch by visiting <https://www.medidata.com/en/medidata-sensor-cloud>

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