



Use of Digital Health Technologies in Patient-Focused Drug Development: A Regulatory Perspective

Lili Garrard, PhD

FDA/CDER/OTS/Office of Biostatistics

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FDA Disclaimer

- The author is an FDA employee and has no conflict(s) of interest to report.
- The views expressed in this presentation are those of the author and should not be construed to represent the official views or policies of the US Food and Drug Administration.

Patient-Focused Drug Development

- **Patients are uniquely positioned** to inform regulatory understanding of the burden of disease and current available treatments
- **Patients** are experts on what it is like to live with their condition
- **Patients'** “chief complaint” is an important factor to explicitly incorporate into drug development plans



Potential Use of Digital Health Technologies (DHTs)

- DHTs have the potential to:
 - Generate rich and comprehensive information on how patients are functioning and feeling
 - Help minimize barriers to obtaining patient experience data during clinical trials
 - Can be operated and accessed remotely
 - Can streamline study and data monitoring procedures
 - Can help maximize recruitment efforts among hard to reach, geographically dispersed, or rare patient populations
- **DHTs may be used to assess study endpoint concepts that are meaningful to patients and can be used to evaluate clinical benefit**

Digital Health Technology (DHT)

Healthy living

Prevention

Diagnosis

Treatment Recovery

Home care

Management

Convergence of computing power, connectivity, sensors, and software used in healthcare.



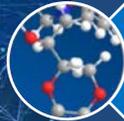
Used as a medical product



Incorporated into a medical product (include a pharmacologic product)



Used to develop a medical product



Used to study a medical product



Used as a companion or adjunct to a medical product, including diagnostics and therapeutics.



Some Example DHTs

- Wearable, implantable, or ingestible sensors
 - Accelerometers, continuous glucose monitors, heart rate monitors
- Environmental sensors placed in subject's home
 - Motion sensors
- Software applications
 - Apps that collect clinical outcome assessments (COAs)
- Other general purpose hardware
 - Mobile phone camera
- Specialized hardware
 - Handheld digital spirometer

DHTs Need to be Fit-for-Purpose

- Verification and Validation
 - Evidence that the physical parameter (e.g., acceleration, temperature, pressure) measured by the DHT is **measured accurately and precisely over time**
 - Evidence that the selected DHT appropriately assesses the clinical variable of interest **in the intended trial population**
 - Evidence that the **algorithm used to interpret the raw signal reliably represents the clinical variable of interest** in the intended trial population
 - **Usability studies** to test ability of future trial participants to use the DHT as directed in the protocol

Defining Clinical Endpoints Using DHTs

- A clinical endpoint(s) should be a clinically meaningful reflection of how a patient feels, functions, or survives
 - Justification is needed, and is not new or unique to those based on data collected from DHTs
- Clinical endpoints measured using data collected from DHTs
 - **Replication of existing endpoints:** are there differences in measurements between DHT and traditional assessment method(s)?
 - **Novel clinical endpoints:** principles the same for DHTs as for novel endpoints captured by other means
 - **Analytic considerations:** pre-specify plans to account for intercurrent events related to the DHT

Some Current Challenges Experienced by Both Regulators and Sponsors



- Limited experience in aggregating and summarizing DHT data into a clinically meaningful endpoint
- Methodology issues including, but not limited to:
 - Determinations of appropriate assessment periods during the day
 - Minimal time requirements for device wearing each day
 - The volume of data collected and aggregating that data over numerous days
 - Missing data

Patient-Focused Meaningful Treatment Benefit

- Same principles for clinical endpoints using DHTs or captured by other means (e.g., other COA types)
- Goal is to understand how differently patients would feel, function, or survive using one medical product relative to some comparator or control
 - Statistical significance can be achieved for small differences between comparator groups, but this finding does not indicate whether individual patients have experienced meaningful clinical benefit

Patient-Focused Meaningful Treatment Benefit

- Need to provide evidence to justify the meaningfulness of treatment benefit
 - Talk to FDA early about plans
 - How much evidence?
 - Depends on how interpretable the COA scores/DHT data are on their own
 - What type of evidence?
 - Quantitative anchor-based methods
 - Mixed methods (e.g., for rare disease drug development)
 - When to provide evidence?
 - Ideally before start of registration trial(s), assessed in different data than those used for efficacy



Looking Ahead

- All measurement tools and clinical endpoints require careful considerations
 - DHTs are not unique in this perspective
- DHTs offer great potential to evolve and improve clinical investigations of medical products
 - Can the DHT tool measure something we haven't been able to measure before?
 - Can the concepts be more easily and accurately measured using a DHT?
 - Will the DHT data complement data collected through traditional methods?
- Leverage recommendations and resources available to determine the appropriateness of DHTs
 - Digital Health Center of Excellence: <https://www.fda.gov/medical-devices/digital-health-center-excellence>
 - Questions: digitalhealth@fda.hhs.gov
- Engage with the FDA early and often



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