

Developing a Physician Sleep Research App Without Developer Experience: Insights from Apple's Limited Beta Program

Maren Clark MS,¹ Jonathan Gomez-Picazo BS,¹ Walter Williamson MS,² Andrew Leroux PhD,² Elizabeth Goldberg, MD, ScM¹

¹Department of Emergency Medicine, University of Colorado Anschutz Medical Campus, Aurora, CO USA

²Department of Biostatistics and Informatics, Colorado School of Public Health, University of Colorado, Aurora, CO USA

Background: Wearable sensors enable continuous, non-invasive data collection in clinical research, but developing custom apps to capture this data often requires technical expertise and resources not available on research teams.¹⁻⁴ To address this barrier, Apple launched the Limited Beta Program, providing a templated framework for researchers without formal software development training.

Purpose: To share the experience of a physician-scientist led team using Apple's Limited Beta Program to develop a research app for REST-EM, a study on sleep and wellbeing among emergency medicine physicians

Methods: In 2024, our team participated in Apple's Limited Beta Program and used the Study App Template in Xcode to create the REST-EM app. The app collected HealthKit and SensorKit data (e.g., sleep duration, heart rate variability, body temperature) and administered surveys via ResearchKit. Data were securely stored on Amazon Web Services (AWS) and integrated with REDCap.

Results: Despite no prior app development experience, our team successfully built and launched the app within six months at no cost. As of November 2025, 164 participants have enrolled in the REST-EM study. Challenges during app development included survey customization, app publishing, and user permission settings, and solutions entailed collaborating with Apple engineers, developing creative workarounds, and providing remote participant support.

Clinical Relevance: Our experience demonstrates that clinician-led teams can independently develop research apps without software developers, reducing barriers to integrating wearable technology into clinical research and care. This approach supports broader access to personalized health insights and fosters innovation in clinical research.

Funding Information: This work was funded by the Apple Investigator Support Program.

References

1. Roos LG, Slavich GM. Wearable technologies for health research: Opportunities, limitations, and practical and conceptual considerations. *Brain Behav Immun.* 2023;113:444–52. Epub 20230807. doi: 10.1016/j.bbi.2023.08.008. PubMed PMID: 37557962; PubMed Central PMCID: PMC11233111.
2. Hebenstreit C. How Technology Is Helping Increase Diversity In Clinical Trials Forbes Forbes 2020 [cited 2025 September 29]. Available from: <https://www.forbes.com/councils/forbestechcouncil/2020/06/18/how-technology-is-helping-increase-diversity-in-clinical-trials/>.
3. Maher C, Szeto K, Arnold J. The use of accelerometer-based wearable activity monitors in clinical settings: current practice, barriers, enablers, and future opportunities. *BMC Health Services Research.* 2021;21(1):1064. doi: 10.1186/s12913-021-07096-7.
4. Azodo I, Williams R, Sheikh A, Cresswell K. Opportunities and Challenges Surrounding the Use of Data From Wearable Sensor Devices in Health Care: Qualitative Interview Study. *J Med Internet Res.* 2020;22(10):e19542. Epub 20201022. doi: 10.2196/19542. PubMed PMID: 33090107; PubMed Central PMCID: PMC7644375.