

Precision Medicine mHealth Research App for Alzheimer's Disease Using OMOP CDM v5.0

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Background

Alzheimer's disease is a serious form of dementia characterized by severe cognitive impairment affecting millions of patients, particularly women and the elderly, and which is expected to be a significant source of morbidity and mortality in the future. We recently performed and published an integrated "big data" analysis of Alzheimer's disease, looking at over 24,000 patients with varying levels of cognitive impairment¹. The findings from this study provide the motivation and foundation for developing new technologies capable of enabling research in precision medicine for Alzheimer's disease.

Precision medicine is a major healthcare initiative that was announced by the President last year as a national priority. The goal is to recruit at least 1 million participants nationwide and use their clinical, genomic, and mobile health (mHealth) data to gain dramatic insight into how this data could impact health². While clinical and genomic data have very standardized data collection approaches, the **collection of standardized mHealth data has not yet been well-defined**. Our project proposes to leverage the iPhone HealthKit framework to overcome existing technical barriers to precision medicine and make scalable mHealth data collection possible for Alzheimer's disease research.

Methods

The NIH Precision Medicine Initiative Working Group Report identified the Observational Medical Outcomes Partnership (OMOP) Common Data Model (CDM) as an important framework for the Precision Medicine Initiative Cohort Program³. In response, the developed Precision Medicine Alzheimer's Disease mHealth Research App is a mobile health adoption of the OMOP CDM Version 5.0, an open source health informatics standard widely used by industry, government, and academic organizations (<http://omop.org>) with potential applications to precision medicine research initiatives.

Using our previously published Alzheimer's disease analytical model and the associated medical and behavioral factors as a guide, we adapted OMOP CDM Version 5.0 for the iPhone HealthKit framework using the Swift programming language¹. The current version of the app has been reviewed, approved, and officially released to the App Store.

iPhone App Download

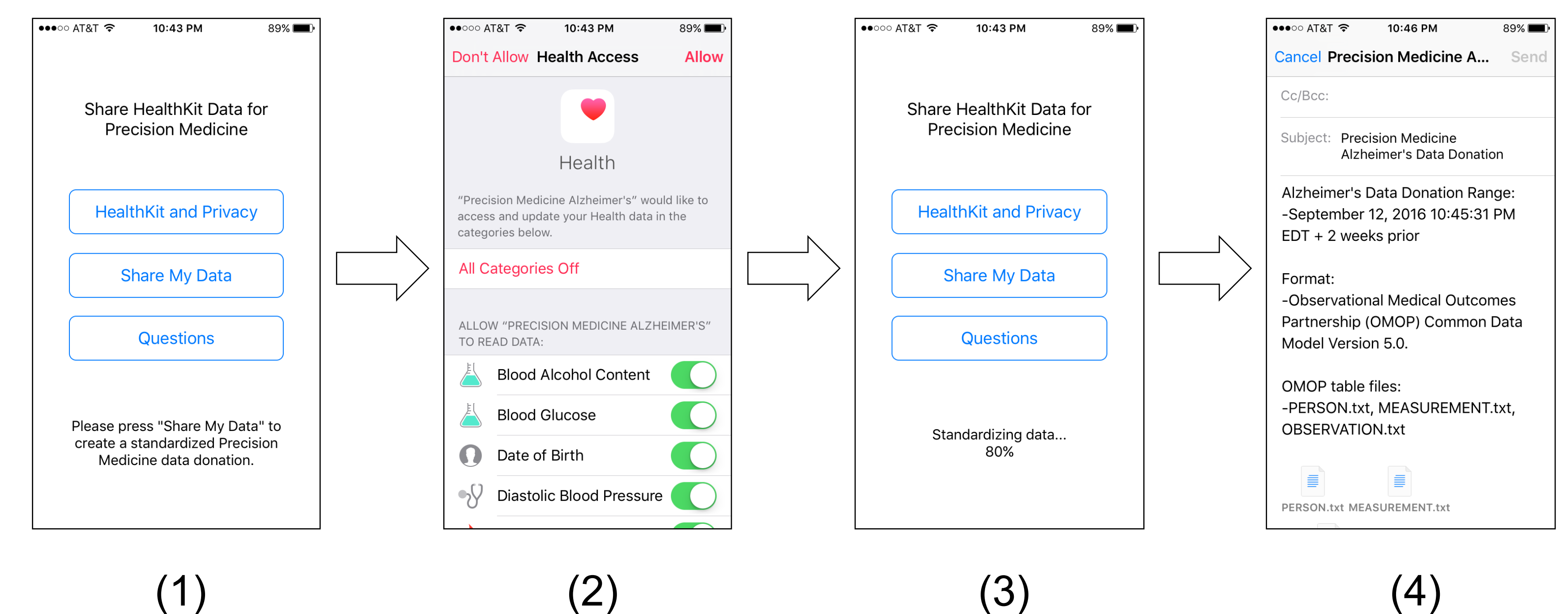
1. Visit iPhone App Store and search for "precision medicine alzheimer's".
2. Download and install app ("Precision Medicine Alzheimer's").
3. Contact jgr@grinformatix.com with questions or to request a promo code.

Contact: jgr@grinformatix.com

Results

Users interested in participating in mHealth research for Alzheimer's will download the app from the Apple App Store and open the app on their iPhone. To share their data, users:

1. Press "Share My Data".
2. Grant permission to access HealthKit data fields they feel comfortable sharing for Alzheimer's research.
3. Let the app generate OMOP CDM files from their HealthKit data.
4. Share their exported data with relevant organizations and institutions of their choosing.



Conclusions and Next Steps

- Mobile devices collect valuable data for precision medicine research areas (e.g. Alzheimer's disease).
- OMOP CDM can be used to standardize mHealth data from mobile devices (e.g. iPhone).
- Future work will integrate HealthKit and ResearchKit to streamline the consent and data collection process for precision medicine mHealth research.

Acknowledgements

Author declares no conflicts of interest. Apple, the Apple logo, and iPhone are trademarks of Apple Inc., registered in the U.S. and other countries. App Store is a service mark of Apple Inc.

References

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2. Collins FS, Varmus H. A new initiative on precision medicine. *N Engl J Med*. 2015;2015 Jan 3:1-3.
3. Precision Medicine Initiative (PMI) Working Group. *The precision medicine initiative cohort program - building a research foundation for 21st century medicine.*; 2015. Available at: <http://www.nih.gov/precisionmedicine/>.