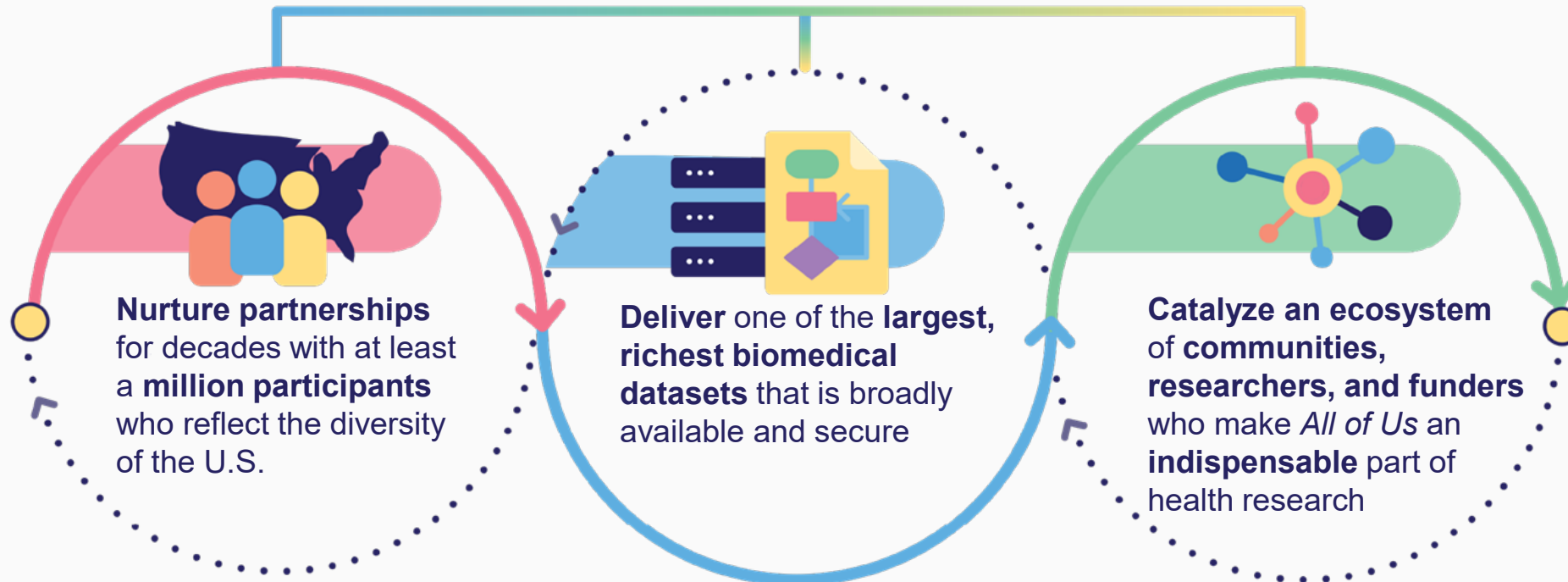


Integration & Standards for *All of Us* Data Types: EHR, Surveys, Wearables, Nutrition

Chandan Sastry, PhD
Deputy, Chief Data Officer
June 3, 2025
All of Us Research Program

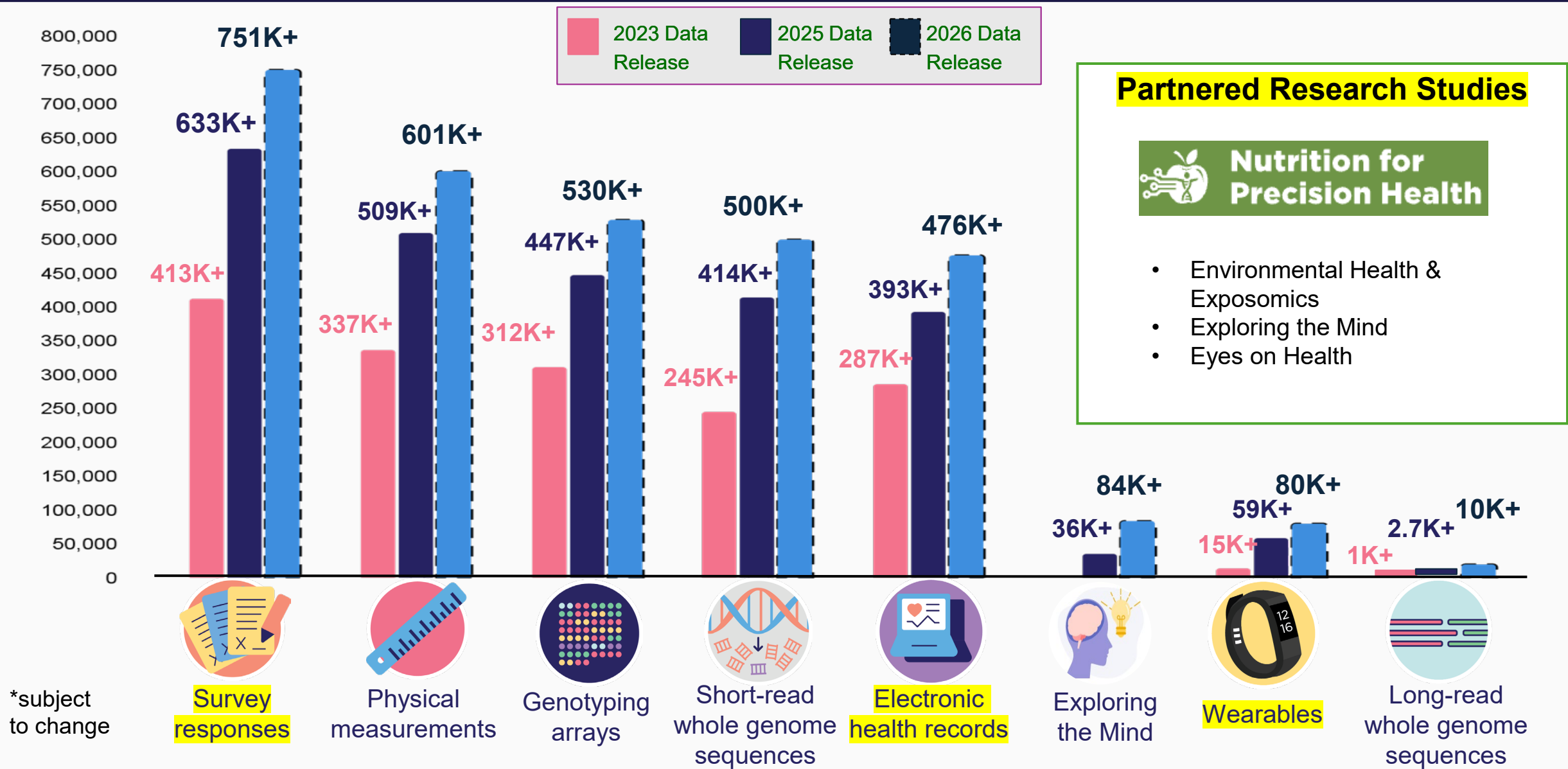
Our Mission

Accelerate health research, enabling individualized prevention, treatment, and care for all of us

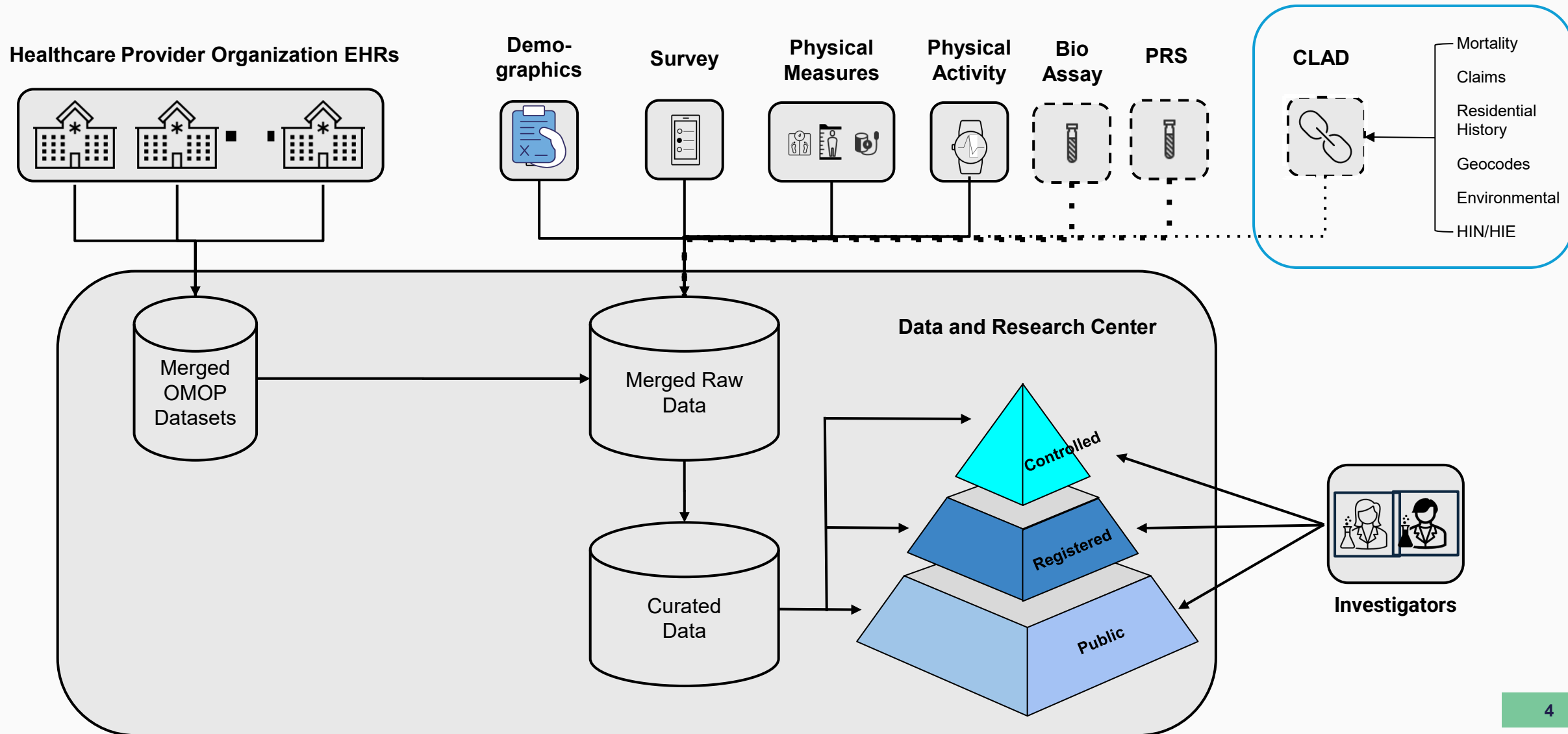


Made possible by a team that maintains a culture built around the program's core values

Major New Data Releases Every 1 to 2 Years with Projected 2026 Data



High Level Data Management



Electronic Health Records

Datasets	Standards	Gaps/Challenges	Recommendation
- Epic - Cerner/Oracle Health - AllScripts - Athena - HPO networks	Codes: ICD, CPT, LOINC, NDC => mapped to SNOMED Interoperability: OMOP CDM, HL7/FHIR	- Loss of granular clinical data - Inconsistent data extraction and OMOP mapping at sites - No text or structured data extracted from clinical notes - Participant healthcare outside of HPO networks not captured	- Explore EHR acquisition strategies with other NIH efforts (N3C, ODSS) - Leverage national platforms (HIE/HIN, TEFCA) - Develop methods to collect participant data outside of HPOs



DHT - Wearables

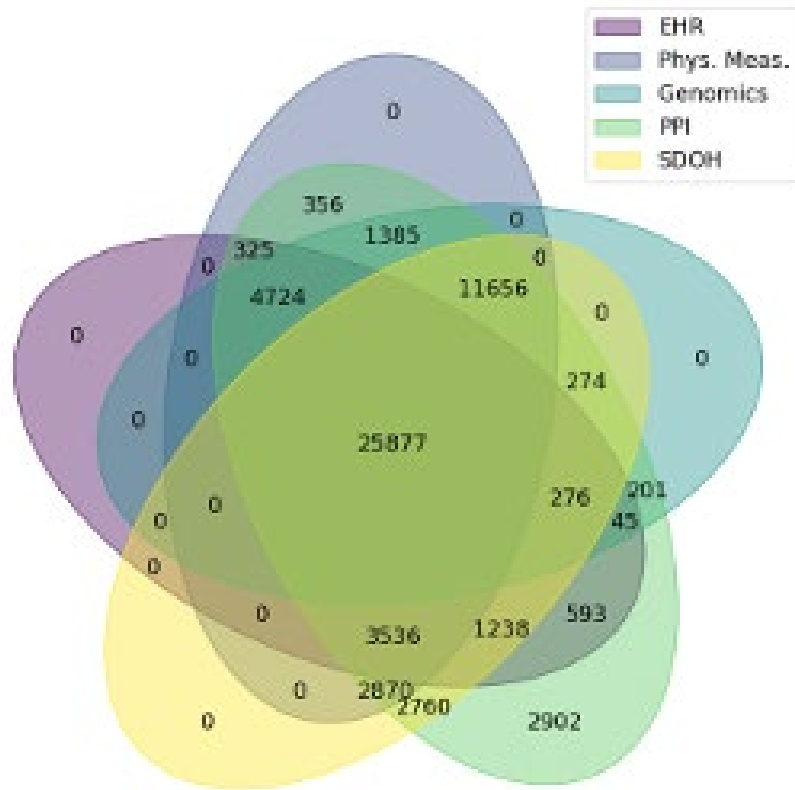
Datasets	Standards	Gaps and Challenges	Recommendation
- Fitbit, - Physical activity - Sleep data - Heart rate - Activity and exercise - Location and mobility - Individual metrics (e.g., minute-level steps, minute-level heart rate) - Summary level metrics (e.g., average daily steps, average daily sleep).	- FHIR - Data provenance - Privacy and security (HIPAA, GDPR) - Data encryption and secure storage	- Data Ownership - Patient Trust, Literacy, and Access - Standards and Interoperability - Integration into Clinical Care - Patient Empowerment and Agency - Reimbursement and ROI for Healthcare Systems	- Provide raw data and computational algorithms for metric computation - Collaborate with HHS groups (e.g., FDA, ONC) to create a common model to support analytical merging of data from multiple device types/software versions

Smartwatches - Apple, Android
 Fitness devices - Fitbit, Garmin
 Metabolic tracking - Lumen
 Smart Rings - Oura



All of Us Participants - Overlap of Fitbit Data with Other Data Types

Count of Participants with Fitbit Data & Multiple Other Data Types



Data Type	Total	
Participants with FitBit Data and:	Total	59,018
	EHR	36,614
	Physical Measurements	50,729
	Genomics	44,438
	PPI Surveys	59,018
	SDOH Survey	48,487

Nutrition for Precision Health

Goal: To develop algorithms to predict individual responses to foods and dietary patterns.

Data types	Standards	Gaps	Recommendation
- Dietary - Omics - Physio-metabolic - Environmental - Lifestyle/behavioral - Participant Characteristics	- REDCap Module 1, 2, and 3 Questionnaires, Physical Measures, and other protocol data - InBody - Dietary Assessment (ASA24, DHQIII, mFR, AIM-2) - Wearable (Dexcom, ActiGraph) - MMC (mapping to the .biom files) - MCAC (UNC clinical assays)	Lack of standard data models to merge data from multiple vendors	Collaborate with ONC, FDA to develop a unified data model for CGH, HL7/FHIR mechanisms for EHR transfer

- Module 1**
 Examines baseline diet and physiological responses to meal challenges
- Module 2**
 Three short-term intervention diets in community-dwelling controlled feeding studies
- Module 3**
 Three short-term intervention diets in domiciled controlled feeding studies

>8,000 All of Us participants

>1,200 Module 1 participants

150 Module 1 participants



Surveys

Datasets	Validated Instruments	Gaps/Challenges	Recommendation
- The Basics - Demographics - Employment - Lifestyle - Overall Health - Personal & Family Health History - Healthcare Access and Utilization - Social Determinants of Health - Neighborhood - Food - Housing - Culture/Language - Behavioral Health and Personality - Emotional Health History and Well-Being - Partnered Research Study Surveys	- PROMIS - PSS – Perceived Stress Scale - CDC HRQOL Health related quality of life measures - IPAQ - International Physical Activity Questionnaire (IPAQ) - AUDIT -Alcohol Use Disorders ID Test - Survey codebooks shared in RedCap Consortium Library - Variables mapped to OMOP Observation table	- Response bias - Sampling Bias – The AoU cohort demographics do not accurately reflect the broader population	Develop statistical tools and methods to address generalizability and sampling

Next Steps - Promoting Innovation Through Data Standards

The *All of Us* Research Program (dataset, platform) represents a collaborative opportunity to improve data standardization and interoperability for NIH sponsored research projects.

- Accelerate Research Impact - develop linkage methods for multi-modal analysis (wearables, genetics, lifestyle, environment)
- Define Standard Phenotypes - collaborate with NIDDK domain experts to define research metrics for usage across multiple projects
- Integrate CGM and EHR datasets - work with HHS partners (ONC, FDA) to bridge wearable data into the clinical record.

Thank You - Making Health Discoveries Possible

The *All of Us* Research Program wouldn't be possible without the generosity of our participants and the dedication of our researchers to enable health discoveries.



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