

The *All of Us* Research Program: Improving Health Through Diverse Technology, Huge Cohorts, and Precision Medicine



May 5, 2023

Joshua Denny, MD, MS
Chief Executive Officer

All of Us Research Program



Factors of Risk in the Development of Coronary Heart Disease—Six-Year Follow-up Experience

The Framingham Study

WILLIAM B. KANNEL, M.D., THOMAS R. DAWBER, M.D., F.A.C.P.,
ABRAHAM KAGAN, M.D., F.A.C.F., NICHOLAS REVOTSKIE, M.D.,
AND JOSEPH STORES, III, M.D.
Framingham, Massachusetts



Framingham Heart Study

Enrolled 5,209 men and women in 1948

INCREASINGLY RELIABLE ESTIMATES of the prevalence and incidence of coronary heart disease (CHD) emphasize the importance of this disease as a contemporary health hazard. Cardiovascular disease is

Since it has been established that coronary atherosclerosis is present for many years prior to the development of symptomatic CHD, it seems evident that efforts at prevention must begin many years before the

now the leading cause of death in the United States. The prevalence of CHD in the United States has increased steadily in the past decade, and this increase is expected to continue. The increase in CHD is a result of a combination of factors, including changes in diet, lifestyle, and genetics. The increase in CHD is a result of a combination of factors, including changes in diet, lifestyle, and genetics.

Received for publication from the Framingham Heart Study, National Heart Institute, U.S. Department of Health, Education, and Welfare, Bethesda, Md. Presented at the American Heart Association National Conference, Boston, Mass., October 1961. Requests for reprints to Dr. William B. Kannel, Heart Disease Branch, National Heart Institute, Bethesda, Md.

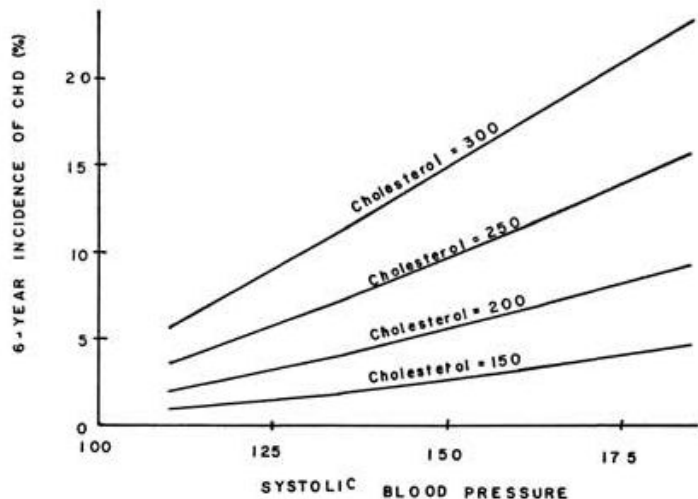


FIGURE 2. Six-year incidence of coronary heart disease according to level of systolic blood pressure at specified serum cholesterol levels (men 45 to 62 years). For explanation, see legends for Figure 1.

Some Framingham early discoveries:

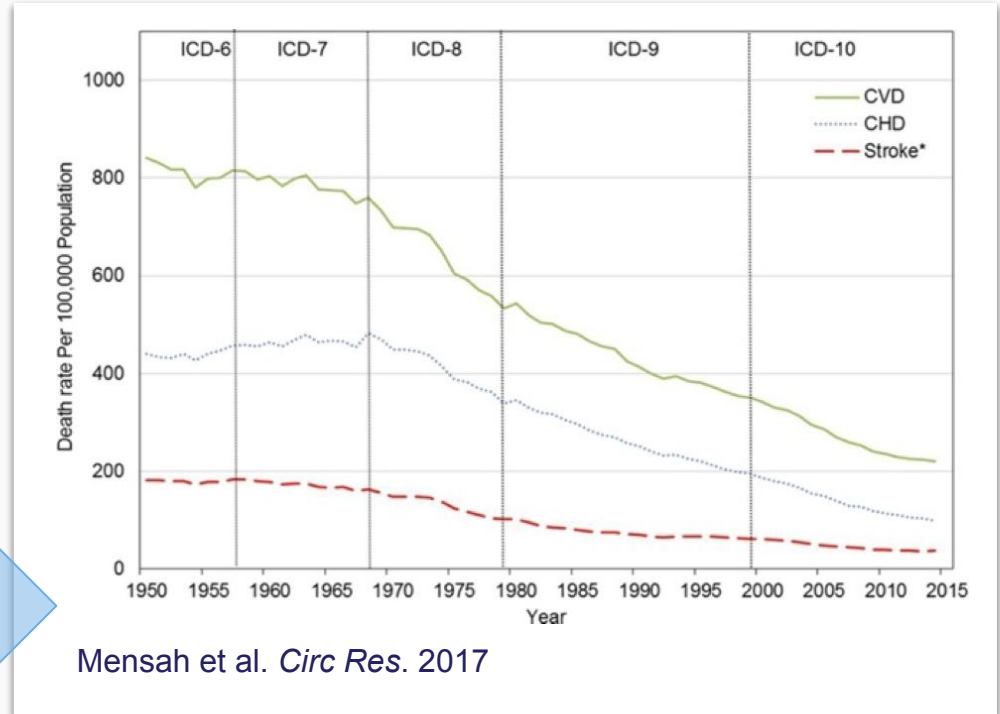
- 1960 – Cigarettes increase heart disease
- 1961 – cholesterol, blood pressure increase heart disease
- 1967 – exercise decreases risk of heart disease; obesity increases it
- 1970 – high blood pressure and atrial fibrillation cause stroke

The Strength of Large Cohort Studies

The impact of Framingham (and similar cohorts) has been dramatic

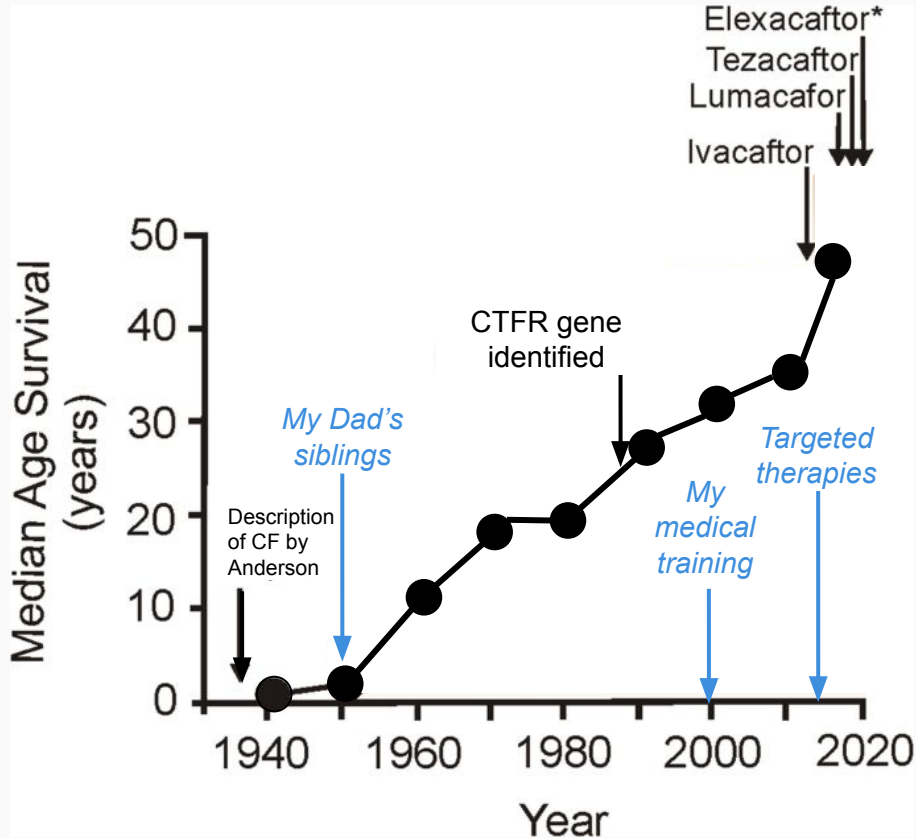
From 1950 - 1996: Heart disease mortality fell 56%, stroke rates fell by 70%

Since 1990, heart disease mortality has continued to fall by 22%



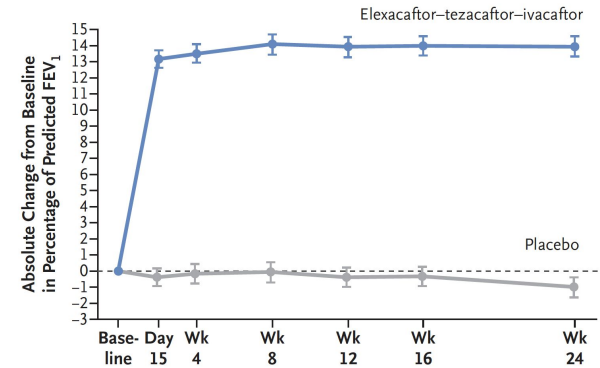
**Could we have a similar
experience with precision
medicine in the next 40 years?**

A Personal Story of Precision Medicine



Bradbury (2021) *Physiology in Health and Disease*, book series

A Percentage of Predicted FEV₁, According to Visit



Before

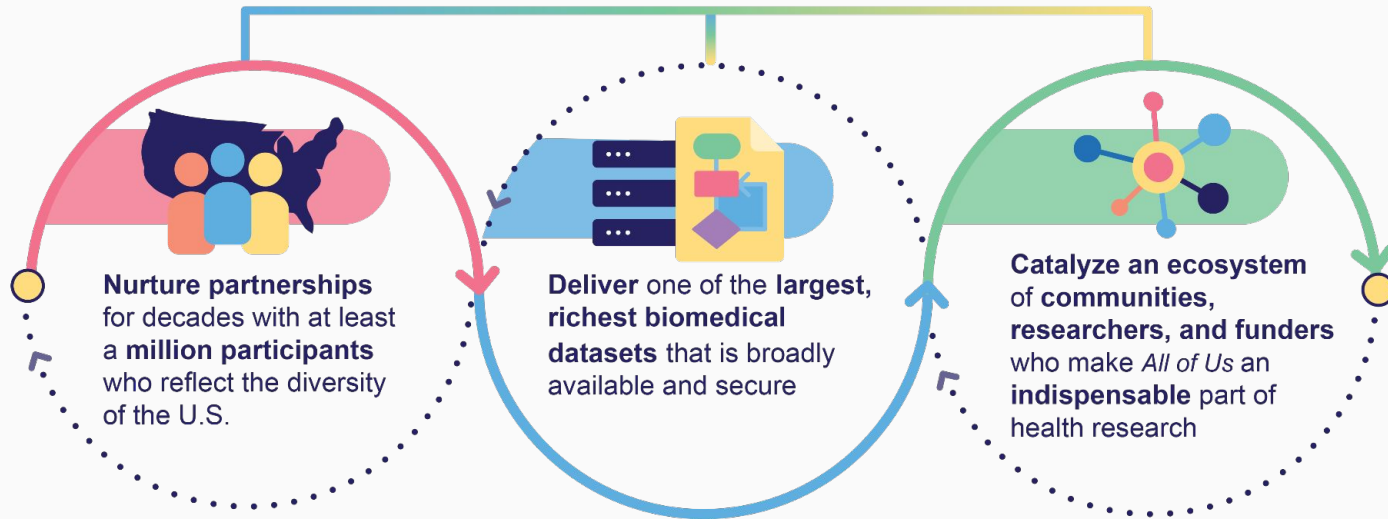


After



The *All of Us* Research Program Mission

Accelerate health research and medical breakthroughs,
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

All of Us Research Program Core Values

Participation is **open** to all.

Participants reflect the rich **diversity** of the U.S.

Participants are **partners**.

Trust will be earned through **transparency**.

Participants have **access** to their information.

Data will be accessed **broadly** for research purposes.

Security and privacy will be of highest importance.

The program will be a catalyst for **positive change** in research.

Starting the Program Right by Engaging Participants

Community Engagement Studios in 2016



77 Studios in 17 cities with 654 community members

- 16 different demographic subgroups, 4 topics
- 46% racial and ethnic minorities
- 9% sexual and gender minorities

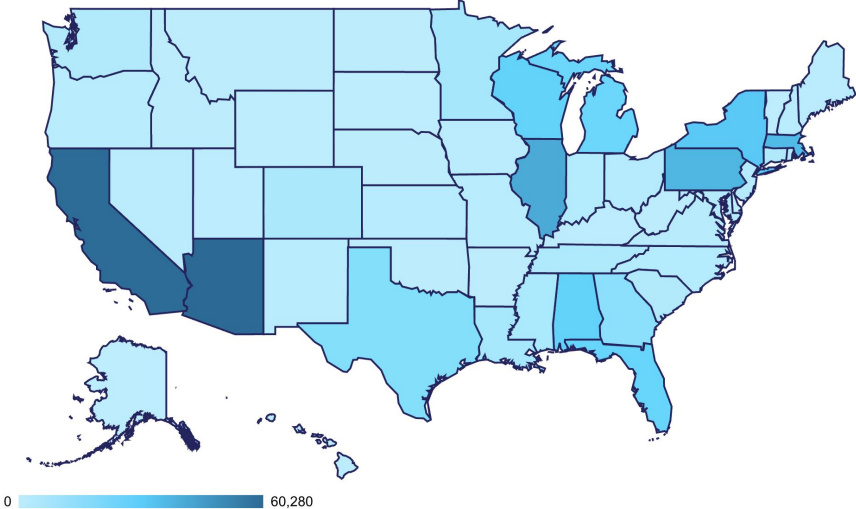
Enrolled 631K+ Participants With Continued Growth

631,000+
Participants

367,000+
Electronic Health
Records

441,000+
Participants who have
completed initial steps of the
program

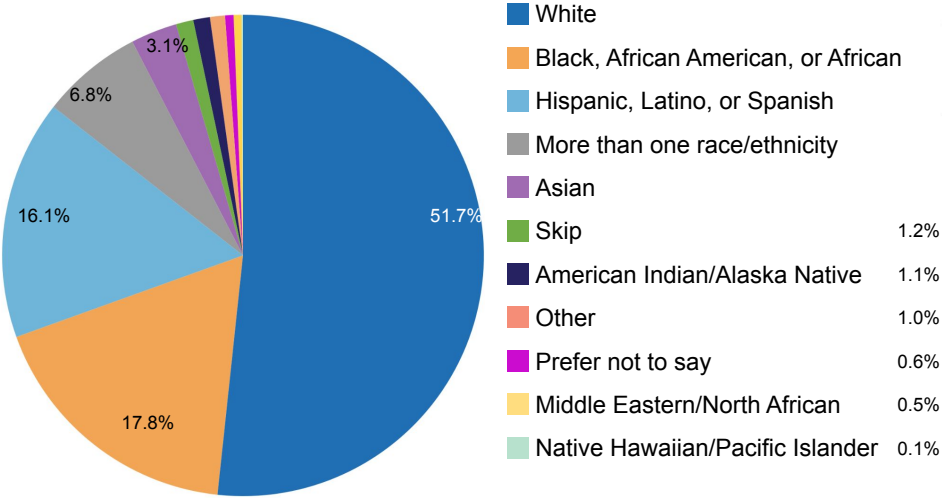
456,000+
Biosamples



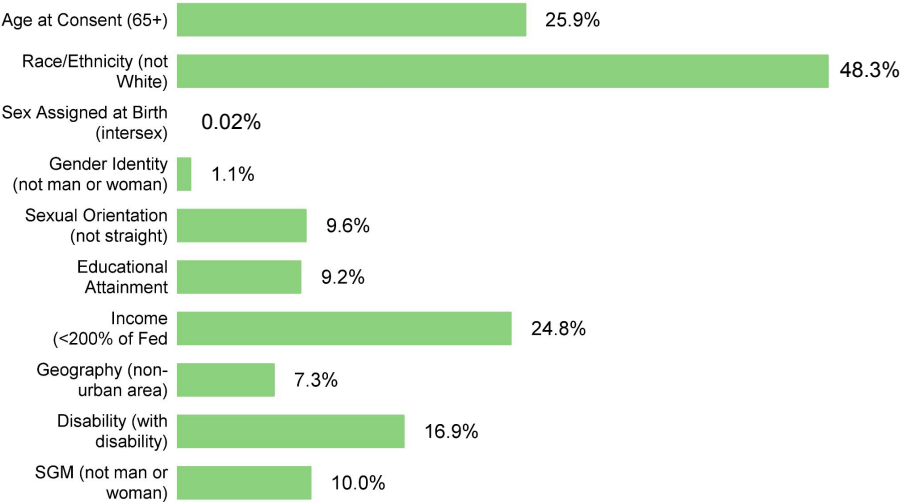
Numbers current as of May 1, 2023

Participant Diversity

Race & Ethnicity of Participants



UBR Category

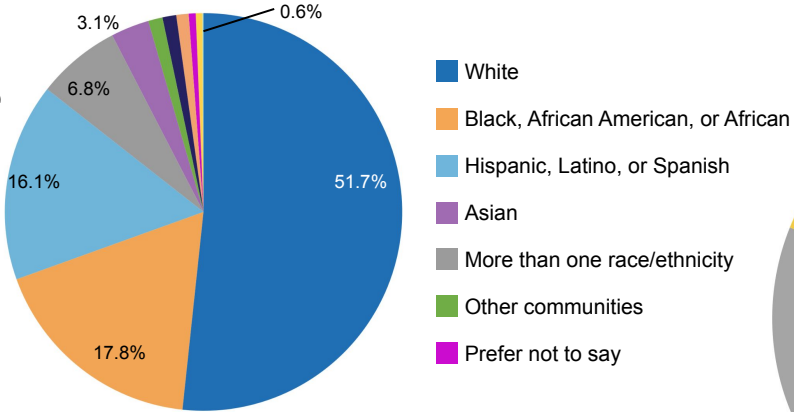


Over 80% of *All of Us* participants are underrepresented in biomedical research

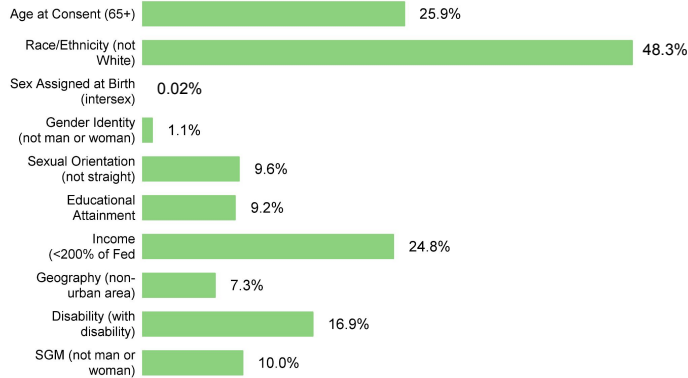
Numbers current as of May 1, 2023

Participant Diversity: Sexual and Gender Minorities (as of May 1, 2023)

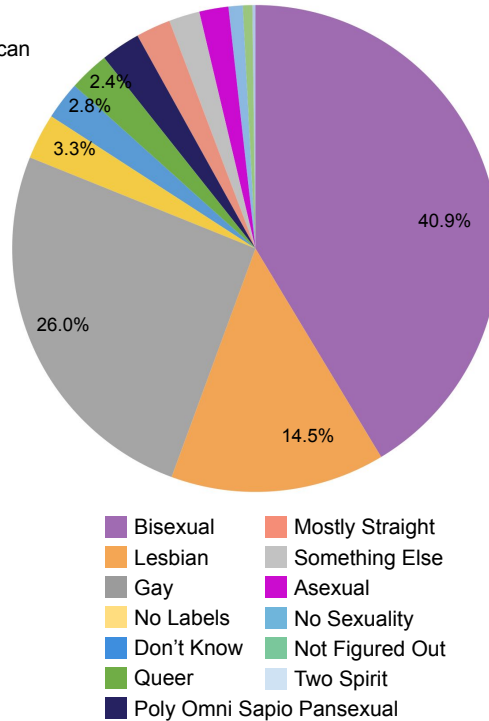
Race & Ethnicity



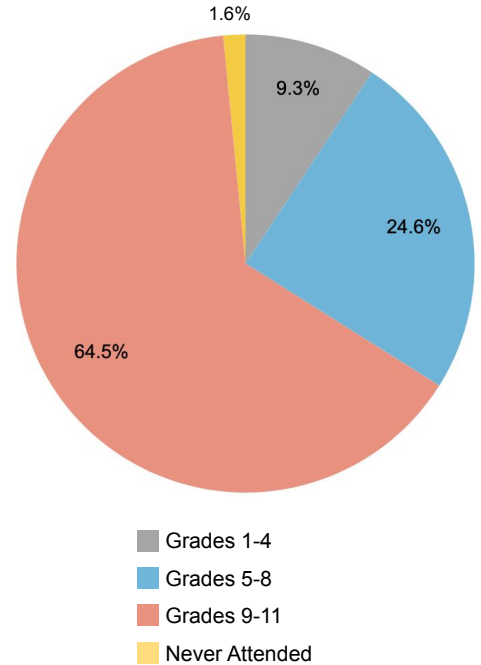
UBR Category



Sexual Orientation



Educational Attainment



All of Us Consortium Members *(beyond community partners, as of April 2023)*

The Participant Center



Communications & Engagement



HPO Network

(Health Care Provider Organizations)

HPO Lite



RMCs

All of Us California



Illinois Precision Medicine Consortium



All of Us New England



Trans America Consortium



New York City Consortium



All of Us Southern Network



All of Us Southeast Enrollment Center



All of Us Wisconsin



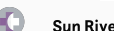
All of Us Pennsylvania



University of Arizona and Banner Health



FQHCs (Federally Qualified Health Centers)



VA Medical Centers



Nutrition for Precision Health (NPH)



Participant Technology Systems Center (PTSC)



Biobank



Data & Research Center (DRC)



Genomics Partners



Note: These are not approved lockups and should not be repurposed on assets.

All of Us Community and Provider Partner Network (as of April 2023)



Note: These are not approved lockups and should not be repurposed on assets.

Data Collected from *All of Us* Participants



Consent and Electronic Health Records



Participant Surveys



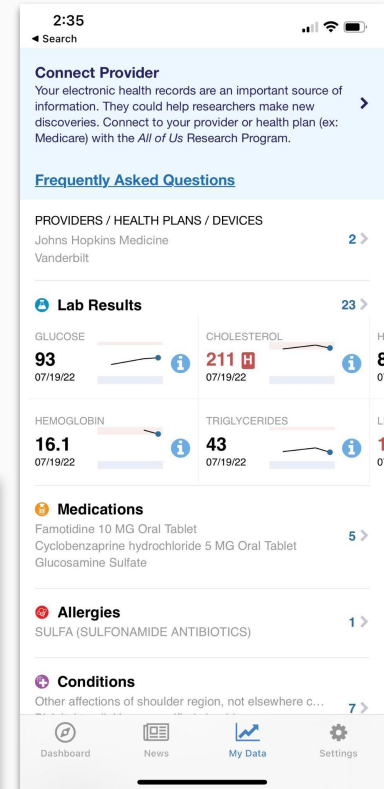
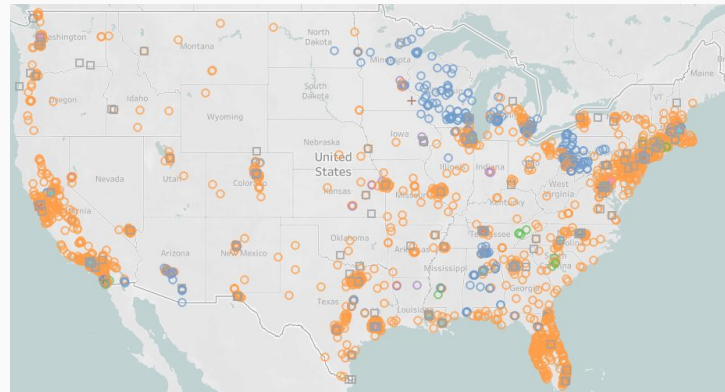
Physical Measurements



Biosamples



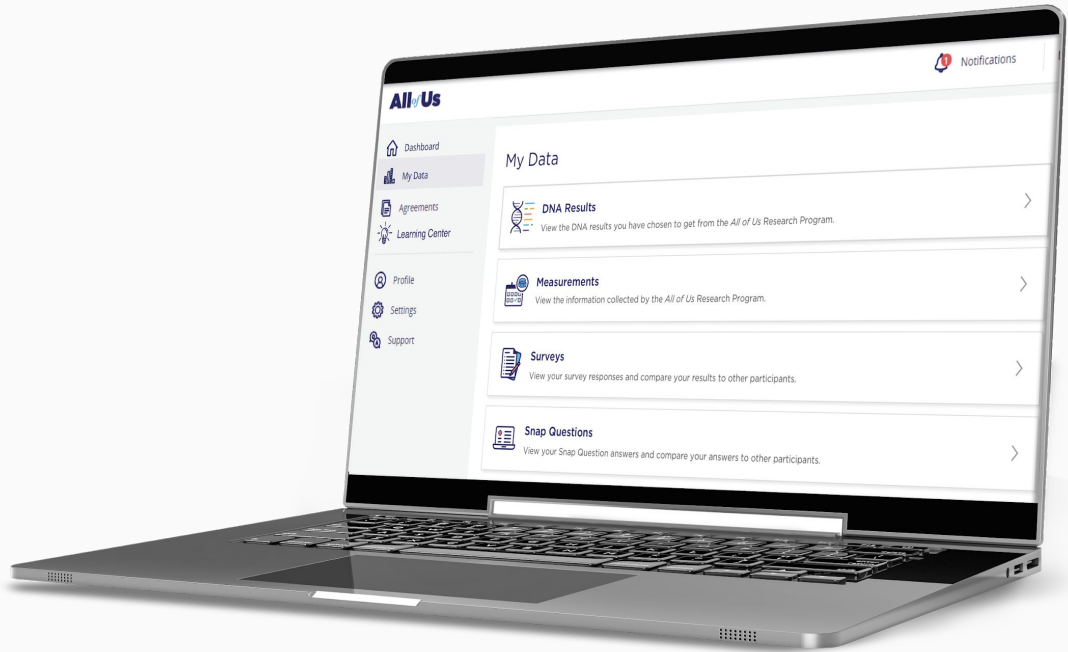
Mobile/Wearable Tech



Returning Value for Participants

Participants may receive:

- ***Genetic information***
- Survey data (comparative)
- EHR and claims data
- Ongoing study updates
- Aggregate results
- Scientific findings
- Opportunities to be contacted for other research opportunities



All of Us Genetics Return Strategy

Engagement

Genetic ancestry and traits results

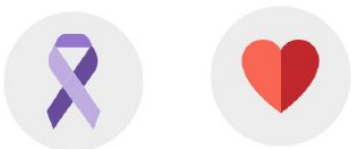


7 regions (21 subregions) and 4 traits

- Sub-Saharan Africa
- Europe
- Oceania
- Southern Asia
- Eastern and northern Asia
- The Middle East and North Africa
- The Americas
- Ear wax
- Bitter taste perception
- Cilantro preference
- Lactose intolerance

Health information

Hereditary Disease Risk Report



59 genes (SNVs + indels)

- Breast cancer
- Ovarian cancer
- Uterine cancer
- Colorectal cancer
- Prostate cancer
- Melanoma
- Brain cancer
- Pancreatic cancer
- Stomach cancer
- Familial Hypercholesterolemia
- Cardiomyopathies
- Arrhythmias
- Arteriopathies

Medicine and your DNA Report



7 genes

- *CYP2C19*
- *DPYD*
- *G6PD*
- *SLCO1B1*
- *NUDT15*
- *TPMT*
- *UGT1A1*

Genetic Ancestry and Traits (as of May 1, 2023)

DNA Results

You'll see all of your DNA results here when they're ready. See [options for your DNA results](#).

Genetic ancestry and trait results

5 results



Genetic ancestry

Genetic ancestry can be very interesting, but you may also learn information you didn't expect. [Learn more](#)

[View Results](#)



Bitter taste percepti

Learn what your genes ca



Cilantro preference

Your genes play a role in



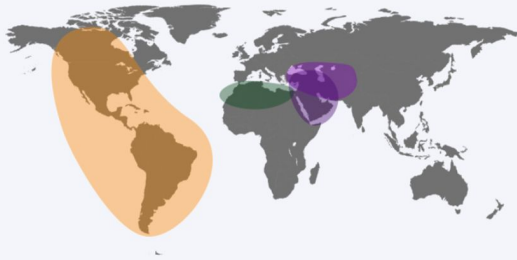
Earwax type

Flaky or sticky? Earwax t



Lactose intolerance

Your genes have a say in



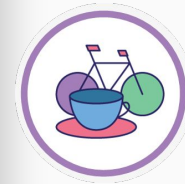
The Americas	50% ▾
The Americas	100%
Such as North, Central, and South America	
The Middle East and North Africa	50% ▾
Northern Africa	10%
Such as Morocco, Algeria, and Egypt	
The Middle East	40%
Such as the Arabian Peninsula and Egypt	
Western Asia and the Caucasus	50%
Such as Turkey, Iran, Syria, Iraq, and the Caucasus	
See Other Ancestry Groups Tested	



182k+ participants were invited to receive their results



131k+ participants viewed their genetic ancestry results



123k+ participants viewed genetic trait results

Genomic Health-Related Return of Results Now Released (as of May 1, 2023)

Hereditary Disease Risk

All of Us currently looks for genetic variants in 59 genes associated with serious health conditions.

All of Us
RESEARCH PROGRAM

JANE DOE
DOB: January 1, 2000
ID: 2

Specimen: Whole Blood
Barcode: AOU 000 000 000 0002
Collected: January 1, 2022
Report date: September 29, 2022

RESEARCH RESULT — Your doctor will need to confirm this result with a clinical test before using it in your care.



Your result:

Something very important for your health was found in your *BRCA1* gene.

What does this mean?

- If confirmed by a clinical DNA test, this result means that you are more likely to get some types of cancers than other people.
- It does **not** mean that you have some types of cancers.
- It does **not** mean that you will definitely get some types of cancers.
- **This result is important** and should not be ignored.

IMPORTANT!

Share this report with your doctor.

- This report comes from a research program, so it is a **research result**. Your doctor will need to confirm these results with a clinical DNA test before using them in your care.
- **Do not change your medical care** before this result is confirmed by your doctor.
- **Results provided are from an investigational device**. An "investigational device" is a device that is the subject of a clinical study.

Medicine and Your DNA

All of Us analyzes seven genes that can affect how bodies metabolize medicines.

All of Us
RESEARCH PROGRAM

DOB:
ID:

Specimen:
Barcode:
Collected:
Report date:

RESEARCH RESULT — Your doctor will need to confirm this result with a clinical test before using it in your care.



Medicine and your DNA

Our genes affect how we respond to medicine.

They do that in many different ways. Some genes help move medicines to the right part of the body.

This test looked at a few of the genes in your DNA that can affect how medicines are used. The technical term for this kind of information is "pharmacogenetics."

What is this kind of information used for?

Doctors and pharmacists use this kind of information when they consider why medicines work differently for different people.

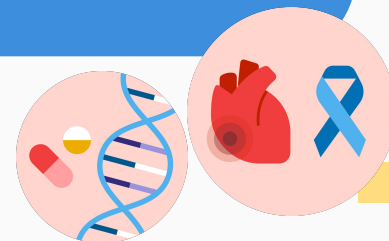
But doctors and pharmacists don't make decisions based on just DNA. Some other important considerations can be age, weight, health, diet, and other medicines you are taking at the same time.

>65,000 participants asked if they want health related results generated

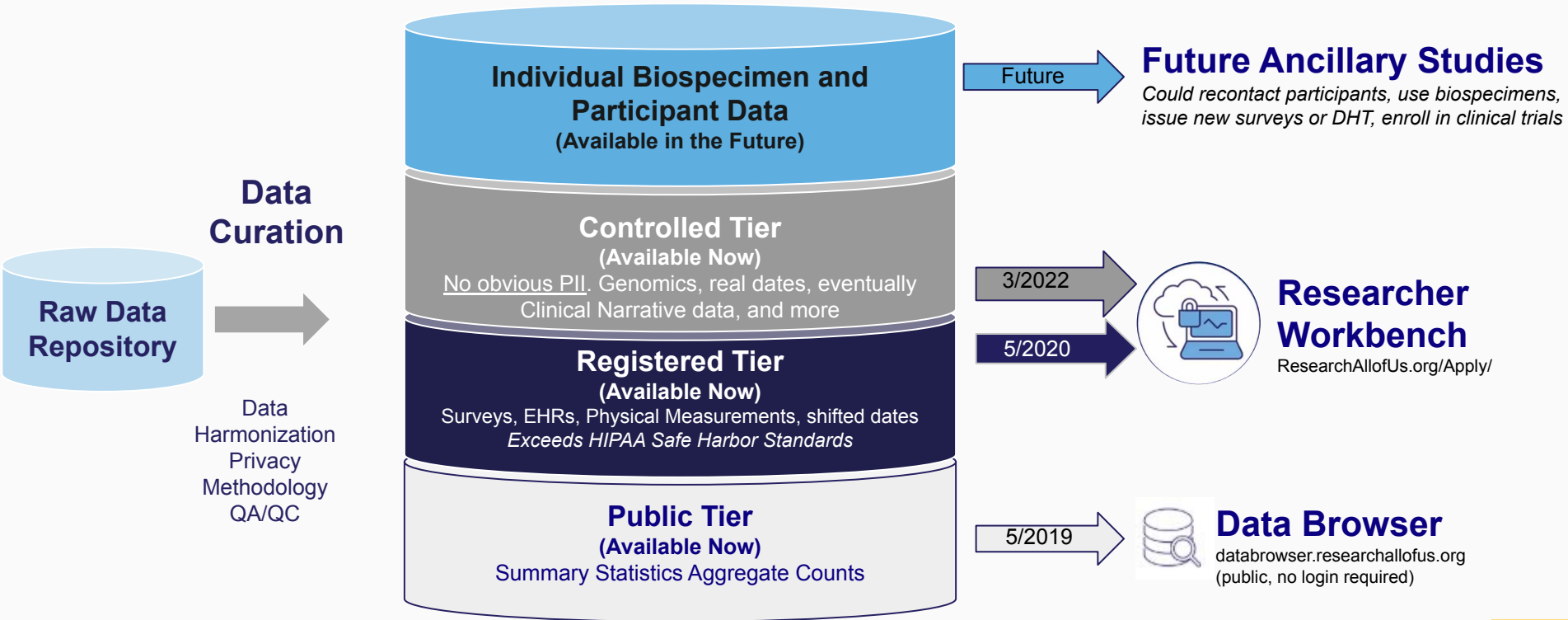
19,066 participants viewed HDR results

19,206 participants viewed PGx results

All of Us is scaling to notify >200,000 participants!



Researcher Data Access



All of Us Research Hub: Public Data Browser

Summary statistics of:

- EHR Data (Conditions, Drug Exposures, Lab & Measurements, Procedures)
- Genomic Variants
- Survey Questions (including COVID-19 surveys)
- Physical Measurements
- **Open Access (no login required)**

DataBrowser.ResearchAllofUs.org



Search Across Data Types

Search: Cancer

Data includes 316,760 participants and is current as of 10/1/2020.

EHR Domains:

- Conditions**
189 matching medical concepts
192,000 participants in this domain
[View Results](#)
- Labs & Measurements**
57 matching medical concepts
182,000 participants in this domain
[View Results](#)
- Procedures**
33 matching medical concepts
182,000 participants in this domain
[View Results](#)

DATA DISCLAIMER

Top 10 by Descending Participant Counts

Top Concepts	Participant Count
Malignant neoplastic disease	35k
Malignant neoplasm of skin	10k
Malignant tumor of breast	7k
Malignant neoplasm of female breast	7k
Carcinoma in situ	7k
Basal cell carcinoma of skin	5k
Secondary malignant neoplastic disease	5k
Malignant tumor of prostate	5k
Malignant neoplasm of respiratory system	3k
Malignant tumor of intestine	2.5k

All of Us Researcher Workbench: Access to Row-Level Data for Analysis

Researcher Workbench

- Cloud-based central resource
- **Passport access model** - just create, describe your workspace, and get to work! **No separate IRB approval needed.**
- Currently open to US nonprofits and nonprofit/for-profit academic and healthcare organizations
- Working to expand to international and broader for-profit audiences as we speak

All of Us
RESEARCHER WORKBENCH

Welcome to the
RESEARCHER WORKBENCH
The secure platform to analyze All of Us data

Workspaces +

- Featured Workspace: Dementia
OWNER
Last Changed: 02/11/20, 07:32 PM
- All of Us Survey Codebook and Frequency Distributions
OWNER
Last Changed: 02/11/20, 07:51 PM
- Featured Workspace: Depression
OWNER
Last Changed: 02/11/20, 07:50 PM
- Featured Workspace - Type 2 Diabetes
OWNER
Last Changed: 02/11/20, 07:50 PM

Recently Accessed Items

- Case 1 Notebook
Last Modified: Mar 06 2020
Notebook
- Dementia Analysis from Cohort Builder
Last Modified: Feb 04 2020
Notebook
- Ischemic Heart Disease Analysis
Last Modified: Feb 04 2020
Notebook
- Dementia Analysis
Last Modified: Feb 04 2020
Notebook
- Type 2 Diabetes Analysis
Last Modified: Jan 31 2020
Notebook
- Ischemic Heart Disease Analysis
Last Modified: Jan 31 2020
Notebook

ResearchAllofUs.org/Data-Tools/Workbench/



Nearly 250,000 Whole Genome Sequences Available to Advance Precision Medicine

As of April 20, 2023, the *All of Us* Researcher Workbench contains the largest set of whole genome sequences widely available for research.



413,350+
Survey Responses



337,500+
Physical Measurements



312,900+
Genotyping Arrays



287,000+
Electronic Health Records



245,350+
Whole Genome Sequences



11,350+
Structural Variants
NEW! In 2023



1,000+
Long-Read Sequences
NEW! In 2023



15,600+
Fitbit Records
NEW! Sleep Data

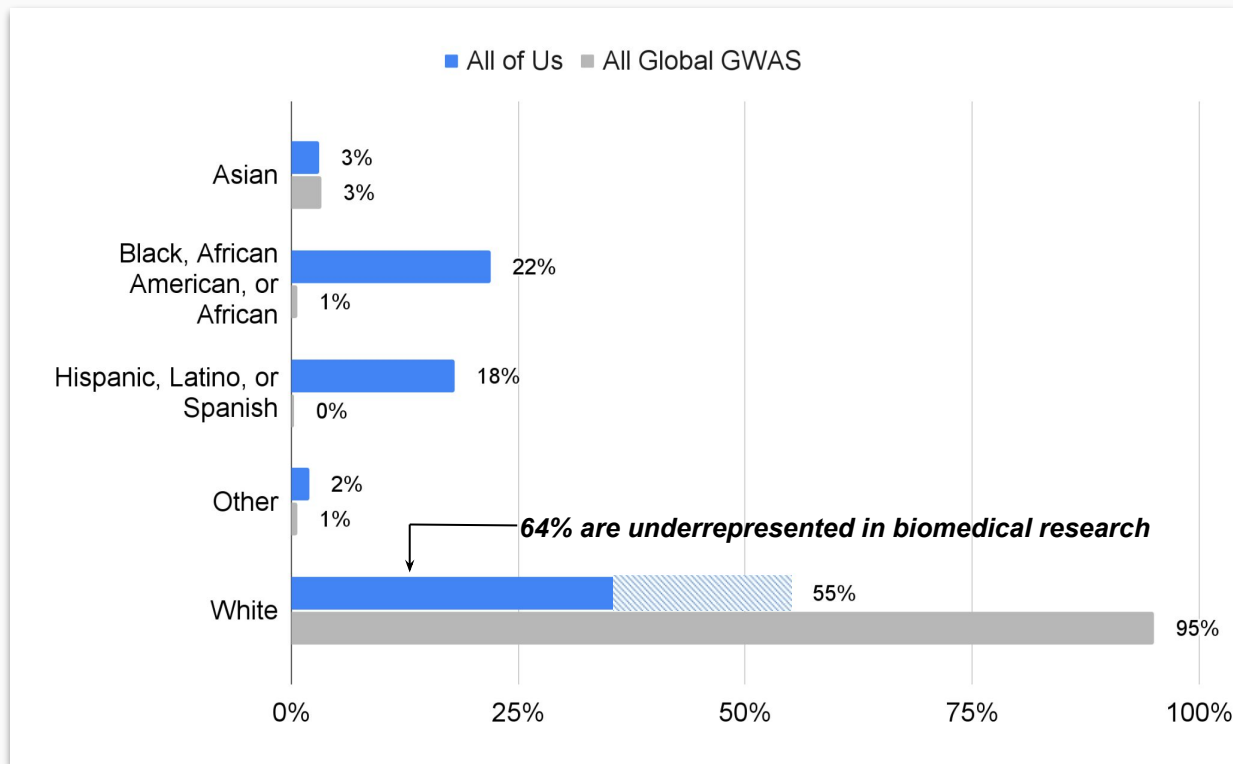
The whole genome sequence dataset includes variation at more than **1 billion** locations, which is nearly **one-third** of the entire human genome

All of Us will Enhance Diversity of Genomic Studies

Updated genomic data set

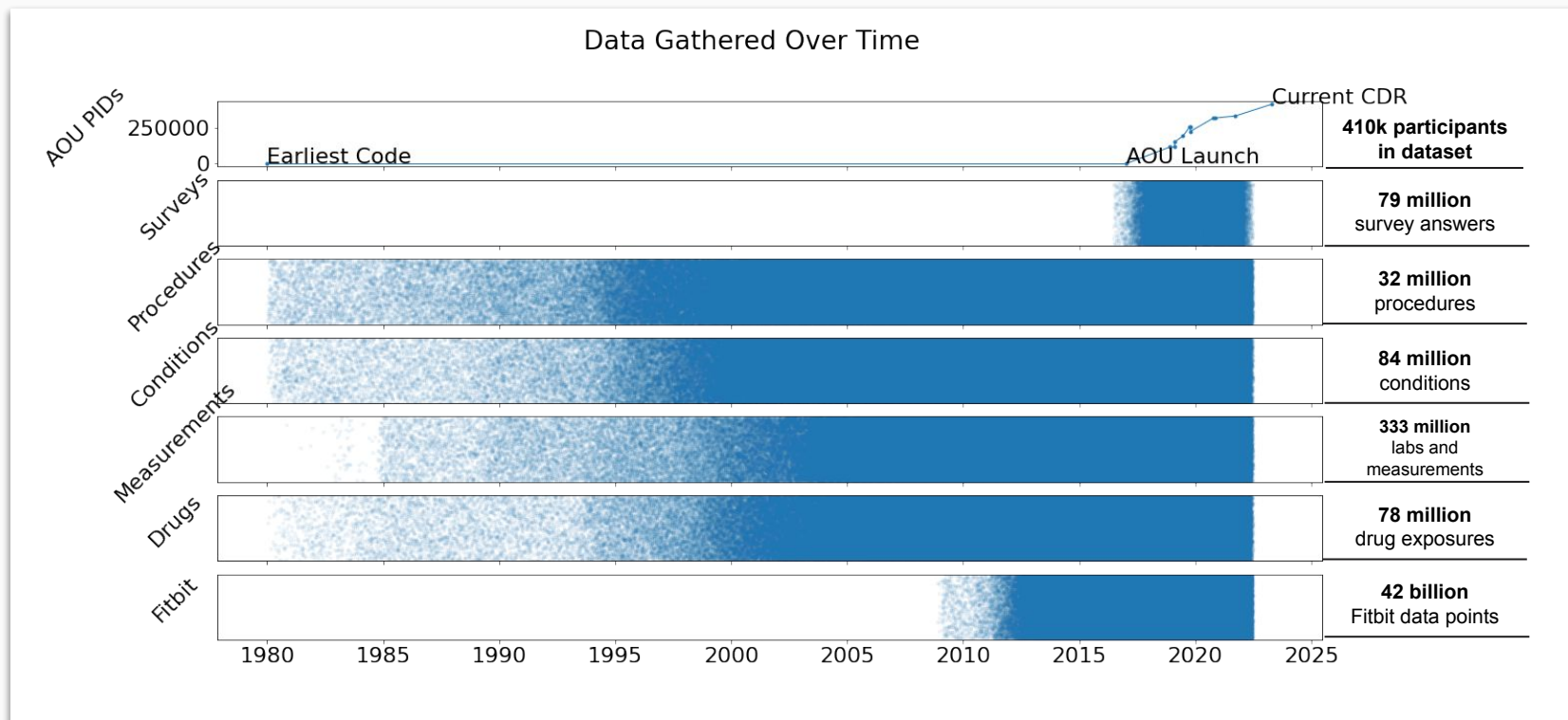
~50% diverse by race/ethnicity

77% underrepresented in biomedical research



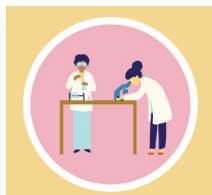
All Global GWAS values from www.gwasdiversitymonitor.com. Values current as of April 20, 2023

Data on the Researcher Workbench is Diverse and Longitudinal



Researcher Workbench Usage and Diversity (as of May 1, 2023)

Research on the Researcher Workbench



5,330+
Registered
Researchers



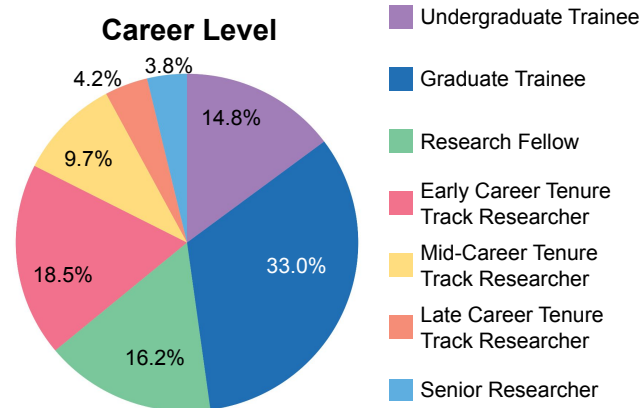
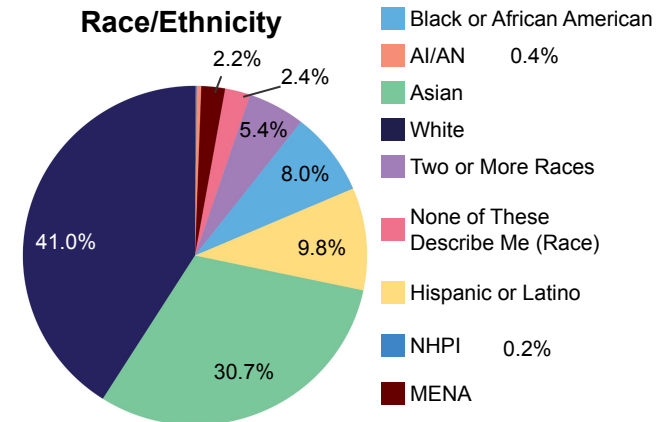
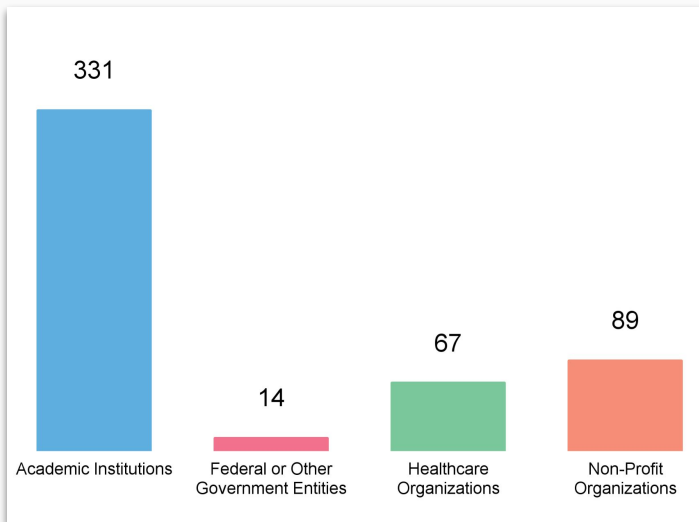
4,660+
Active
Projects



150+
Publications
using *All of Us*
data

510+ Organizations:

- 36 Historically Black Colleges & Universities
- 45 Hispanic Serving Institutions



Science Update (as of May 1, 2023)

All of Us Publications



152 Make us of
All of Us Data

All of Us
RESEARCH PROGRAM

41 Published by
the Program



researchallofus.org/publications/

nature > nature medicine > articles > article

Article | [Open Access](#) | [Published: 10 October 2022](#)

Association of step counts over time with the risk of chronic disease in the All of Us Research Program

Hiral Master, Jeffrey Annis, Shi Huang, Joshua A. Beckman, Francis Ratsimbazafy, Kayla Margineanu, Robert Carroll, Karthik Natarajan, Frank E. Harrell, Dan M. Roden, Paul Harris & Evan L. Brittain

Antibodies to Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) in All of Us Research Program Participants, 2 January to 18 March 2020

Keri N Althoff, David J Schlueter, Hoda Anton-Culver, James Chery, Joshua C Denny, Isaac Thomsen, Elizabeth W Karlson, Fiona P Havers, Mine S Cicek, Stephen N Thibodeau

> [Am J Hum Genet.](#) 2023 Feb 2;110(2):228-239. doi: 10.1016/j.ajhg.2023.01.003. Epub 2023 Jan 20.

Functional interpretation, cataloging, and analysis of 1,341 glucose-6-phosphate dehydrogenase variants

Renee C Geck¹, Nicholas R Powell², Maitreya J Dunham³

Ophthalmology Glaucoma

Available online 15 March 2023

Press, Corrected Proof What's this?



OPEN ACCESS PEER-REVIEWED

RESEARCH ARTICLE



An Overview of Cancer in the First 315,000 All of Us Participants

Briselis Aschebrook-Kilfoy, Paul Zakin, Andrew Craver, Sameep Shah, Muhammad G. Kibriya, Elizabeth Stepp, Andrea Ramirez, Cheryl Clark, Elizabeth Cohn, Lucia Ohno-Machado, Mine Cicek, Eric Boerwinkle, Sheri D. Scott. On behalf of the All of Us Research Program Investigators [view all]

Published: September 1, 2022 • <https://doi.org/10.1371/journal.pone.0272522>

Evaluating Discrepancies in Self-Reported Glaucoma and Electronic Health Records in the National Institutes of Health All of Us Database

Megan E. Paul BA¹, Victoria L. Tseng MD, PhD², Ken Kitayama MD, MPH^{2,3}, Fei Yu PhD^{2,4}, Anne L. Coleman MD, PhD^{2,3}

Health disparities in the treatment of bipolar disorder

Vladimir Tchirikov^a, Mark E. Ladner^a, Felicia V. Caples^b, Mitzi Morris^c, Christina D. Jordan^c, Joyce E. Balls-Berry^d, Monica J. Taylor-Desir^e, Mark J. Vallender^{a,*}

Published in final edited form as:

Ophthalmol Sci. 2022 March ; 2(1): . doi:10.1016/j.xops.2021.100099.

Novel Association between Opioid Use and Increased Risk of Retinal Vein Occlusion Using the National Institutes of Health All of Us Research Program

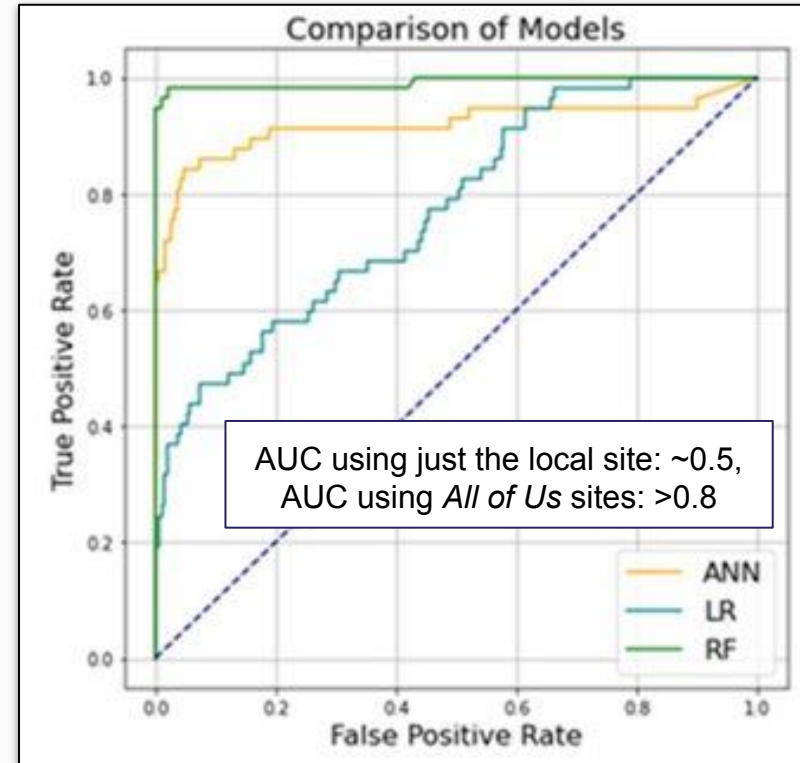
Machine Learning in *All of Us* to Predict Glaucoma Outcomes

Predictive Analytics for Glaucoma Using Data From the *All of Us* Research Program

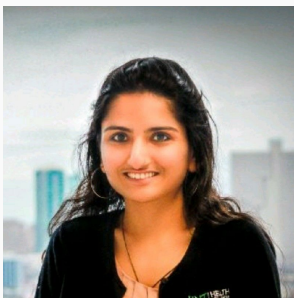


SALLY L. BAXTER, BHARANIDHARAN RADHA SASEENDRAKUMAR, PAULINA PAUL, JIHOON KIM, LUCA BONOMI, TSUNG-TING KUO, ROXANA LOPERENA, FRANCIS RATSIMBAZAFY, ERIC BOERWINKLE, MINE CICEK, CHERYL R. CLARK, ELIZABETH COHN, KELLY GEBO, KELSEY MAYO, STEPHEN MOCKRIN, SHERI D. SCHULLY, ANDREA RAMIREZ, AND LUCILA OHNO-MACHADO, ON BEHALF OF THE ALL OF US RESEARCH PROGRAM INVESTIGATORS

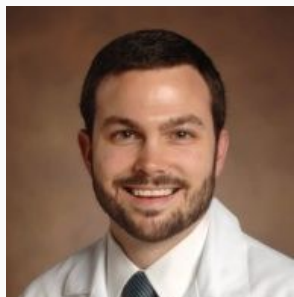
Conclusion: Models trained with national *All of Us* data achieved superior performance compared to using single-center data.



All of Us Discoveries: Physical Activity and Human Disease

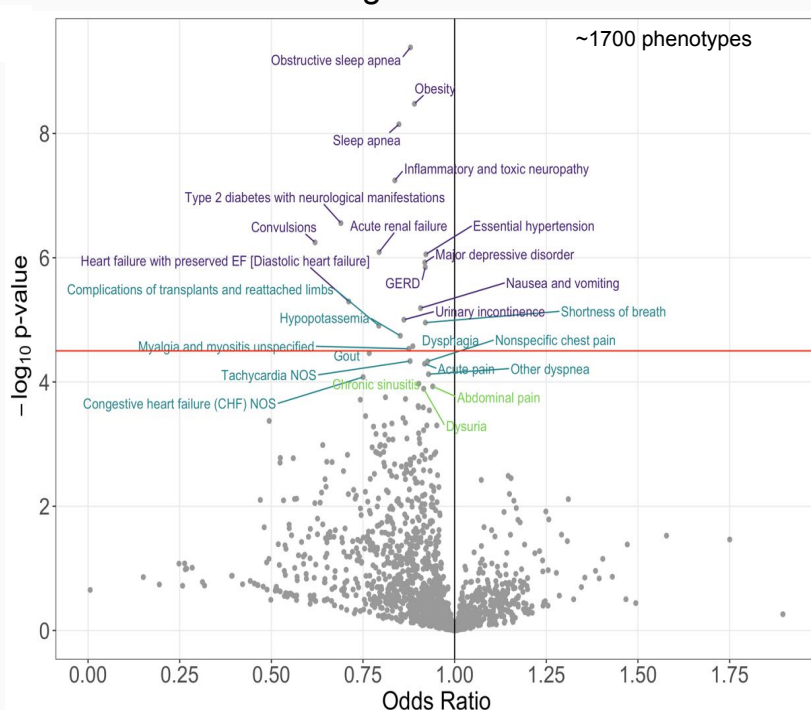


Hiral Master, PT, PhD, MPH, CPH
Senior Scientist at
Vanderbilt University Medical Center

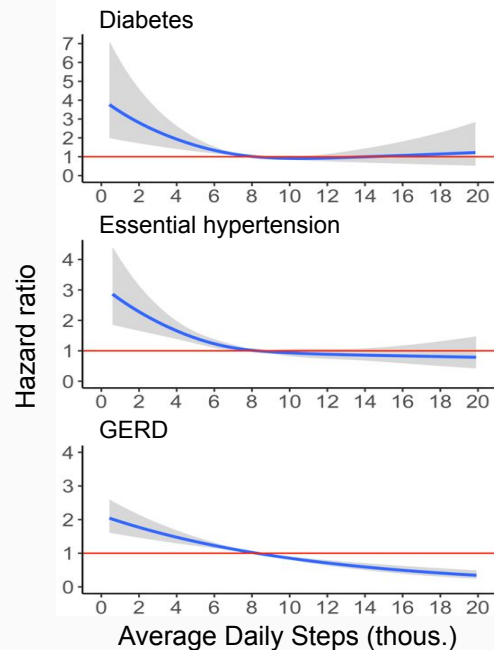


Evan Brittain, MD, MSc
Associate Professor of Medicine, Division of
Cardiovascular Medicine at
Vanderbilt Translational and Clinical
Cardiovascular Research Center

Incident Diagnoses after 6 months



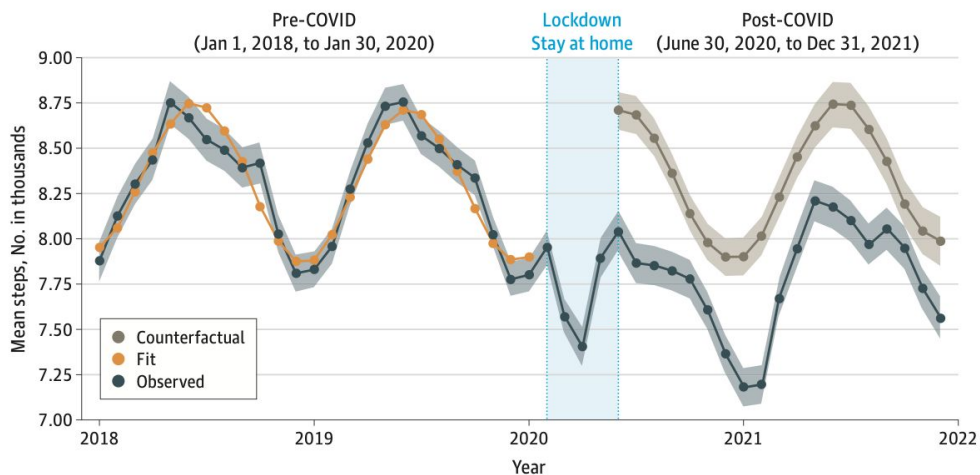
- Analysis uses average of daily steps *prior to diagnosis*.
- Effect size per 1000 steps, adjusted for age, sex, race



Adjusted for age, sex, race, CAD, cancer, BMI, systolic blood pressure, education level, smoking, alcohol use, and *monthly daily steps (time varying)*

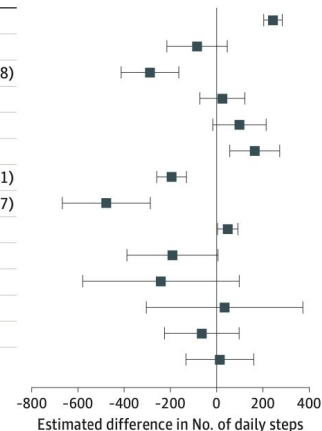
Impact of the COVID-19 Pandemic, Sociodemographics, and Mental Health Factors on Average Daily Steps

A Daily steps



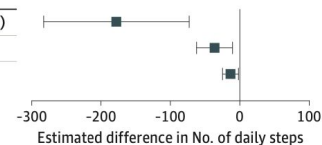
B Sociodemographic factors, vaccination status, and comorbidities vs differences in observed and estimated (counterfactual) daily steps post-COVID

Variable	Estimated step differences (95% CI)
Age (10 y)	243.43 (203.54 to 283.33)
Male (vs female)	-84.55 (-215.01 to 45.90)
Northeast (vs all other)	-288.08 (-412.58 to -163.58)
Midwest (vs all other)	24.75 (-72.52 to 122.03)
South (vs all other)	98.58 (-16.68 to 213.84)
West (vs all other)	164.75 (56.94 to 272.56)
Median income (\$10 K)	-194.70 (-258.89 to -130.51)
Deprivation index (tenths)	-477.08 (-667.78 to -286.37)
Vaccinated (vs unvaccinated)	48.04 (4.04 to 92.04)
Obesity	-190.87 (-387.70 to 5.96)
Diabetes	-241.32 (-580.06 to 97.42)
Coronary artery disease	34.40 (-303.82 to 372.62)
Cancer	-64.13 (-225.33 to 97.07)
Hypertension	13.72 (-132.76 to 160.21)

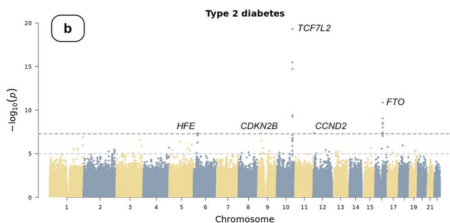
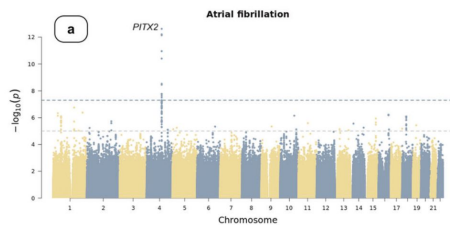


C Mental health factors with differences in observed and estimated (counterfactual) daily steps post-COVID

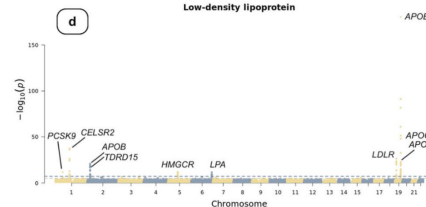
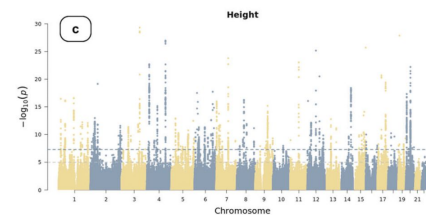
Variable	Estimated step differences (95% CI)
IES	-177.88 (-282.84 to -72.92)
PHQ	-36.38 (-62.29 to -10.46)
PSS	-13.42 (-24.89 to -1.96)



Common and Rare Variants Associated with Cardiometabolic Traits in *All of Us* Participants



Binary traits	Gene	Dataset	N carriers	OR [95%CI]	P value
AF	TTN	AoU	1010	2.14 [1.63, 2.81]	5.05E-8
		UKB	1858	2.06 [1.75, 2.4]	8.23E-18
T2D	GIGYF1	AoU	56	9.17 [3.28, 25.62]	2.39E-5
		UKB	55	5.61 [2.9, 10.32]	3.04E-7



Continuous traits	Gene	Dataset	N carriers	Beta [95%CI]	P value
Height	ADAMTS17	AoU	94	-0.49 [-0.63, -0.36]	2.18E-12
		UKB	173	-0.34 [-0.45, -0.24]	6.14E-11
	ACAN	AoU	22	-0.84 [-1.13, -0.56]	6.02E-9
		UKB	42	-1.17 [-1.38, -0.96]	6.86E-28
LDL	NPR2	AoU	39	-0.46 [-0.66, -0.25]	1.27E-5
		UKB	114	-0.62 [-0.75, -0.49]	1.26E-21
	APOB	AoU	36	-1.55 [-1.87, -1.23]	1.78E-21
		UKB	237	-2.24 [-2.37, -2.11]	2.94E-262
LDL	LDLR	AoU	23	0.97 [0.57, 1.37]	2.06E-6
		UKB	98	0.66 [0.47, 0.86]	4.06E-11
	PCSK9	AoU	23	-0.71 [-1.11, -0.31]	4.78E-4
		UKB	245	-0.94 [-1.06, -0.81]	9.19E-49

What Does It Look Like To Do an Analysis in *All of Us*? A Genome Wide Association Study (GWAS) of Type 2 Diabetes



All of Us
RESEARCHER WORKBENCH

Welcome to the
RESEARCHER WORKBENCH
The secure platform to analyze *All of Us* data

Workspaces +

Create your first workspace
As you create your workspaces, this area will store your most recent workspaces. To see all workspaces created, click on **See all workspaces** to the right.

Cohorts +

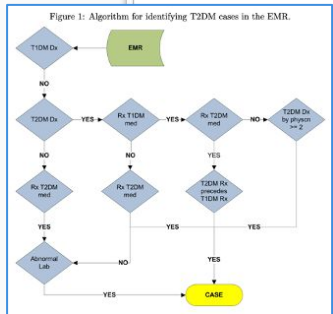
A cohort is a group of participants based on specific criteria.

All of Us Participants → Your Cohort

Datasets +

A dataset is a table containing data about a cohort that can be exported for analysis.

ID	Med	Lab
ID 1	Med 1	Lab 1
ID 2	Med 2	Lab 2
ID 3	Med 3	Lab 3



- ~23M SNPs
- ~20k participants
- GWAS runtime of ~20 minutes
- Cost \$37

1 GWAS using Hall in Jupyter Notebooks

2 Initializing Hall

3 Load our data

3.1 Environment details

3.2 Variant calls from the WGS

```
In [4]: M = ht - hl.read_matrix_table('gs://fc-secure-4a0212f0-46f4-4a79-99f9-af89808c0606/data/cohort_2_359u_cleaned.ht')
```

3.3 Case/control and demographics information

```
In [5]: M = table = (hl.import_table(ht.bucket('ny/2020status.csv'), imports=[('sex', types={'person_id': hl.tstr}), ('key', {'person_id'})]).table
```

2021-11-21 21:08:14 Hall: INFO: Reading table to impute column types

2021-11-21 21:08:15 Hall: INFO: Finished type imputation

Loading field 'person_id' as type str (user-supplied type)

Loading field 'gender_concept_id' as type int32 (imputed)

Loading field 'gender' as type str (imputed)

Loading field 'race_concept_id' as type str (imputed)

Loading field 'race' as type str (imputed)

Loading field 'ethnicity_concept_id' as type int32 (imputed)

Loading field 'ethnicity' as type str (imputed)

Loading field 'sex_at_birth_concept_id' as type int32 (imputed)

Loading field 'sex_at_birth' as type str (imputed)

Loading field 'ny2020status' as type bool (imputed)

Loading field 'isFemale' as type bool (imputed)

All of Us Data Includes Range of Diseases

Conditions	Domain	Participants
Heart Disease	Heart	73,100
Obesity	Endocrine	65,740
Type 1 Diabetes	Endocrine	5,620
Type 2 Diabetes	Endocrine	45,360
Any cancer	Cancer	42,080
Asthma	Pulmonary	40,560
Chronic Obstructive Pulmonary Disorder	Pulmonary	19,740
Epilepsy	Neuro	7,440
Stroke	Neuro	640
Rheumatoid Arthritis	Autoimmune	6,980
Osteoarthritis	Autoimmune	81,980

Conditions	Domain	Participants
Depressive Disorder	Mental Health	67,380
Bipolar Disorder	Mental Health	12,820
Dementia	Mental Health	4,760
Human Immunodeficiency Virus	Infectious Disease	4,640
COVID-19*	Infectious Disease	58,000*
Alcohol Abuse (AUDIT-C)	Abuse	84,000
Opioid Usage	Medication	155,000
Age-Related Macular Degeneration	Eye	4,740
Hearing loss	Hearing	30,400
Falls	Ageing/Nursing	4,860

*using combination of diagnosis code, lab test, and COVID survey answers

All of Us Researcher Workbench: Access to Row-Level Data for Analysis



LEARN MORE ABOUT THE DATA AVAILABLE

Explore the data available through the [Data Browser](#), which provides interactive views of aggregate-level participant data. Learn about individual-level [data access tiers](#) and the [Researcher Workbench tools](#).



CHECK FOR YOUR INSTITUTION'S AGREEMENT

Before you can register, your institution must have a [Data Use and Registration Agreement](#) in place with *All of Us* to ensure data security.



CREATE A RESEARCHER WORKBENCH ACCOUNT

Complete your researcher profile, sign the Terms of Service, and agree to the Privacy Policy.



VERIFY YOUR IDENTITY USING LOGIN.GOV

Verify your identity using Login.gov. You may need to provide an SSN and a state-issued ID. Your institution may also require you to use an eRA Commons account. If so, contact your institution directly. [Read more about Login.gov](#).



COMPLETE ALL OF US RESEARCH TRAINING

The mandatory training provides education on conducting responsible and ethical research with data from *All of Us* participants. Please allow at least one hour to complete.

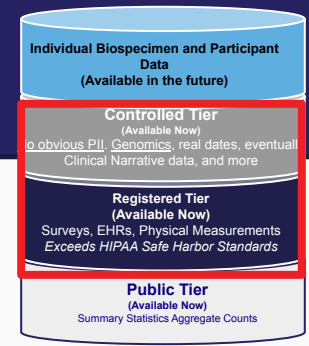


SIGN THE DATA USER CODE OF CONDUCT

The Data User Code of Conduct is an agreement that outlines the program's expectations for researchers.



ResearchAll of Us.org/Data-Tools/Workbench/



What Kind of Research Can *All of Us* Support?

Example studies in *All of Us*

- Associations between diseases, medications, behaviors, SDOH, genomics
- Health disparities
- Historically underrepresented populations
- Genomics and PGx
- Drug target discovery
- Early disease detection
- Geospatial linkages (future)
- ***Insert your topic here***

Modalities of research *All of Us* supports

- AI/ML
- Risk stratification
- Predictive analytics
- Phenotype algorithms & cohort development
- Novel method development
- Basic EHR investigations
- Validation of other studies

All of Us is **not**

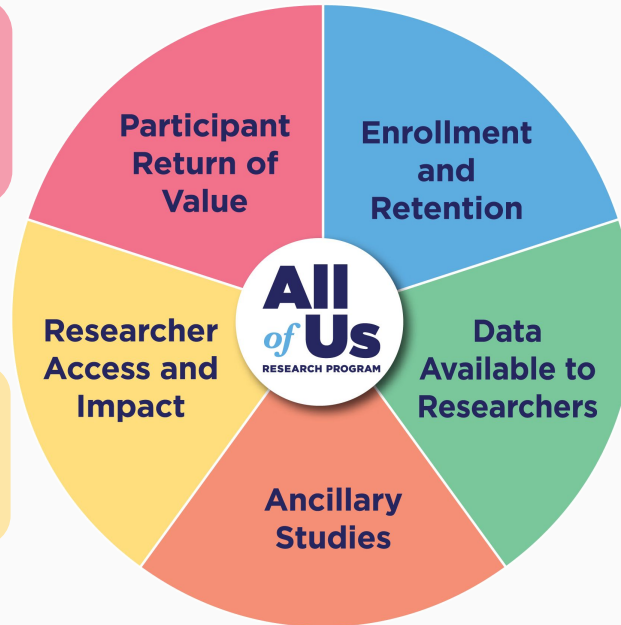
- A representative US sample
- A study with uniform follow-up of all variables

Our Five Year Goals (2021 - 2026)

By end of 2026, we will:

Incorporate participant **return of value** into data collections and assess its impact, including return of information to participants on **genomics** and **EHR**.

Establish a **diverse global community of 10,000 researchers** productively using *All of Us* data.



Enroll 1 million participants who reflect the **diversity** of the U.S., cover the **lifespan**, and have **shared all baseline elements**. Of these participants, **500,000 participate in ongoing data donation opportunities**.

Expand data available for 1 million participants to include survey, health data streams, a whole genome sequence, **environmental** data, and physical measures.

Launch **ancillary studies** as a core and scalable capability, expanding the cohort and delivering phenotypic, lifestyle, environmental, and biologic data.

Nutrition for Precision Health

Powered by the *All of Us* Research Program



1



Examine baseline diet and physiological responses to meal challenges

10,000 *All of Us* participants

2



Examine responses to 3 short-term intervention diets in free-living controlled feeding studies

1,500-2,000 Module 1 participants

3



Examine responses to 3 short-term intervention diets in domiciled controlled feeding studies

500-1,000 Module 1 participants

In all 3 modules

- Collect microbiome, physiological, metabolic, behavioral, cognitive, and environmental data, and leverage existing genomic, EHR, and survey data, and conduct mixed meal challenges to model the impact of diet and dietary patterns on physiological responses
- Use machine learning and artificial intelligence to develop predictive algorithms

Funding Opportunities with *All of Us*



OTA-22-006:
ROA for *All of Us* Engagement, Communications, and Enrollment Partnerships

Submission Due Dates:
Multiple, final on May 23, 2025



RFA-HG-21-041:
R01 Clinical Trial Optional for New Investigators to Promote Workforce Diversity in Genomics, Bioinformatics, or Bioengineering and Biomedical Imaging Research

Submission Due Date:
February 22, 2024, 5:00 PM Applicant's time zone

Coming soon: Two 10-min mental health and well-being surveys

Emotional Health History and Well-Being

Emotional Health History and Well-Being

12 minutes

Start



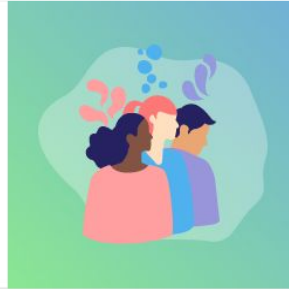
Generalized and lifetime anxiety
Present and past depression
Suicidal behavior
Childhood and adult adversity/trauma
General well-being

Behavioral Health and Personality

Behavioral Health and Personality

10 minutes

Start



Adult ADHD
Bipolar disorder
Psychosis
Panic disorder
Obsessive compulsive disorder
Social phobia and agoraphobia
Personality

What do your responses say about your personality?

The "Big 5" refers to a model of personality that includes five key traits. The Big 5 personality model has been thoroughly studied and confirmed as valid.

Each of the traits really falls on a spectrum or a scale. For example, the extroversion trait has extroversion on one end of the scale and introversion on the other end. Most people fit somewhere in between these.

These results report on only five personality traits, so they do not fully reflect who you are. Your traits indicate how you may respond in different situations. How you actually respond will depend on more than just your traits.

Several different survey tools measure the Big 5 personality traits. The expert group assigned to develop the Mental Health and Well-Being survey choose this tool for several reasons:

- The survey is a validated tool
- The survey covers all five personality traits
- The survey includes only 15 questions



Openness

Openness is how someone feels about new experiences and ideas.

Your answers show that you **sometimes** enjoy new experiences, but **sometimes** prefer familiar experiences.

People at this end prefer...
Familiar ideas and experiences
Concrete ideas



Conscientiousness

Conscientiousness is how organized someone is and if they prefer structure and rules.

Your answers show that you are **usually** spontaneous and like to save tasks for later.

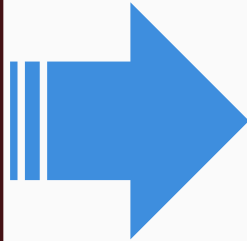
People at this end tend to...
Save tasks for later
Be spontaneous and enjoy living in the moment

And those on this end tend to...
Spend more time to prepare
Be organized & disciplined

Participants will receive customized, real-time "Big 5" personality trait report– the first survey to provide instant personalized return of information to participants!

Launching our Pediatric Cohort

Age at Enrollment: Current State



Age at Enrollment: Future State



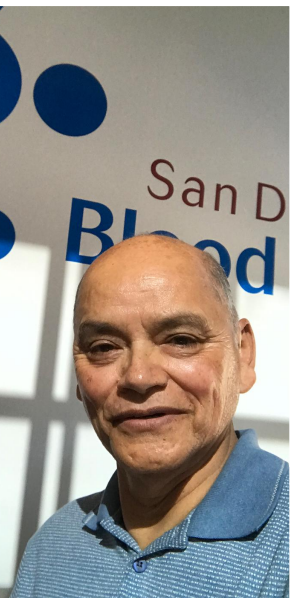
Sara Van Driest, MD, PhD
Director of Pediatrics, *All of Us*
Previously, Assoc Prof of
Pediatrics and Clinical
Pharmacology, VUMC



[AllofUs.NIH.gov](https://www.allofus.nih.gov)

[JoinAllofUs.org](https://www.joinallofus.org)

[ResearchAllofUs.org](https://www.researchallofus.org)



Thank you!

@AllofUsResearch
@AllofUsCEO
#JoinAllofUs



Thank you to our 631,000+ participants!