



All of Us Evenings with Genetics Research Program
Presents:
Campus Seminar Series at Baylor College of Medicine

All of Us, the All of Us logo, and “The Future of Health Begins with You” are service marks of the U.S. Department of Health and Human Services.

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College of
Medicine

DEPARTMENT OF
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GENETICS



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All of Us

RESEARCH PROGRAM

Have you heard about the *All of Us* Research Program? Or the *All of Us* Researcher Workbench?



Goal: invite 1 million people



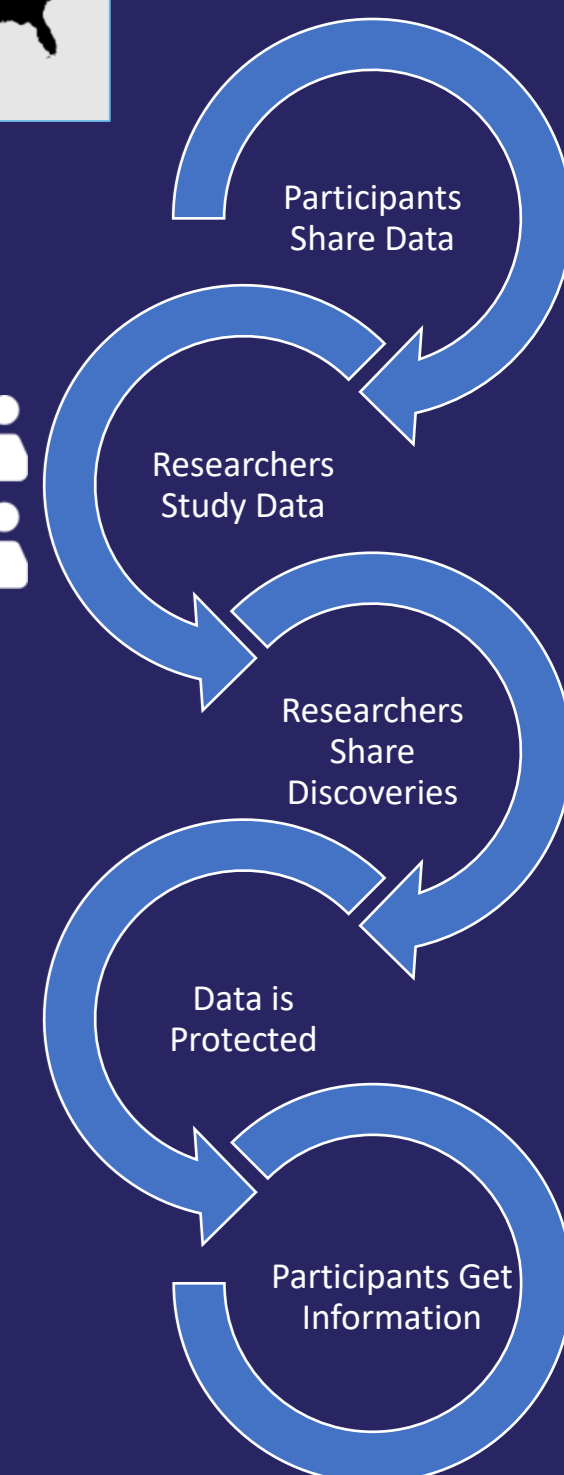
Data in Researcher Workbench

725,000+ participants



80% from underrepresented communities

50% racial and ethnic minorities



Key Benefits of the *All of Us* Research Program

Enables discovery through broad exploration of data

- Instead of granting data access on a project-by-project (or question-by-question) basis, the program uses a "**data passport**" model to give registered researchers access to all of the data on the platform for wide-ranging analyses.
- Connects researchers to **engaged participants** who may be eager to participate in future, ancillary studies.
- Facilitates **oversight** while enabling **openness**

Paints a more complete picture of health by engaging those who have been left out of medical research in the past:

- Building upon the traditional longitudinal study model by layering on dense, omic data from a broader, more diverse population
- Creating a resource for research that may be used to inform thousands of individual questions/studies across health conditions
- Enabling researchers to easily look at data across different sources, encompassing biological factors and social determinants of health

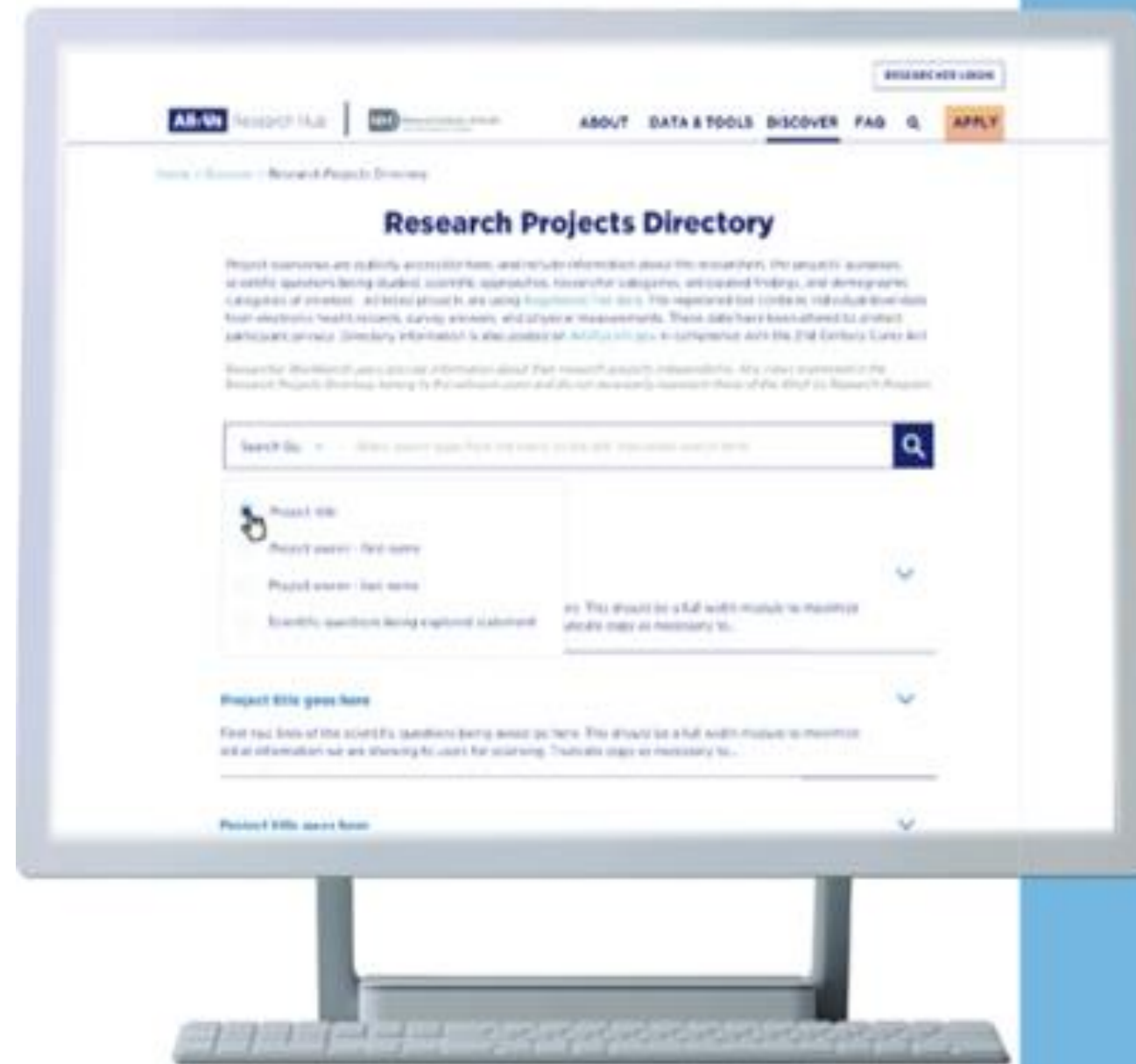
Provides access to data for researchers across diverse settings and career stages

- Centralized, secure, cloud-based platform allows researchers across a wide range of settings and at all stages of their careers to execute rapid, hypothesis-driven research with just a computer and internet connection
- Facilitates equity in access in a deliberately inclusive way
- Currently, any U.S.-based academic, nonprofit, or health care organization can enter into our data use agreement as the first step of accessing our cleaned and curated data set

What type of research will it enable?

Transformative research potential

- Conduct **prospective, retrospective, and cross-sectional** analyses
- Develop improved **risk assessment and prevention strategies** to preempt disease
- **Investigate health disparities** and find new approaches to **improve** health equity
- Provide **earlier and more accurate diagnoses** to reduce illness burden
- Increase **wellness and resilience**, and promote healthy living
- Create a line of sight to enable new precision **treatments and interventions**



While making the data accessible to researchers across stages and settings

Our Researchers



7596+

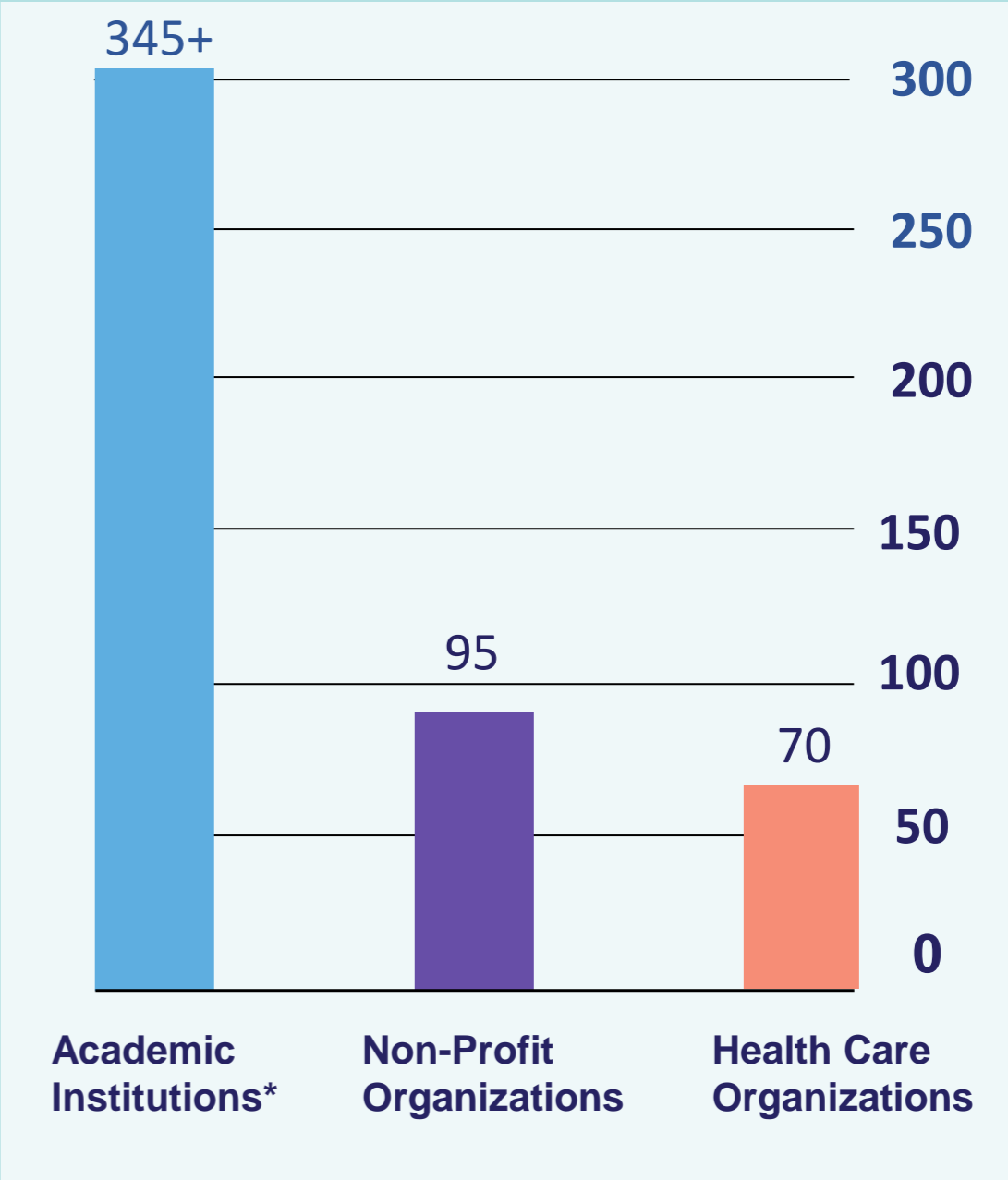
Registered Researchers

across a range of institutional roles and career stages



601+

Institutions



*Includes 85+ Historically Black Colleges and Universities and Hispanic-Serving Institutions.

Figures accurate as of September 2022

Research Currently Underway



7596+

Active projects



200+

Publications in peer-reviewed journals



Top conditions being studied

In the Researcher Workbench include:

- Cardiovascular disease
- Hypertension
- Mental Health
- Cancer
- Diabetes

Figures accurate as of July 2023

All of Us securely capturing a range of different data types

The *All of Us* Research Program's Data and Research Center (DRC) curates a range of different data types as part of the data collection process.



413,350+

Survey Responses



337,500+

Physical Measurements



312,900+

Genotyping Arrays



287,000+

Electronic Health Records



245,350+

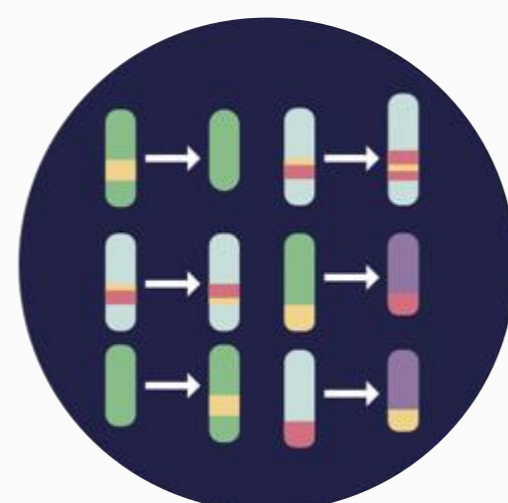
Whole Genome Sequences (WGS)



15,600+

Fitbit Records

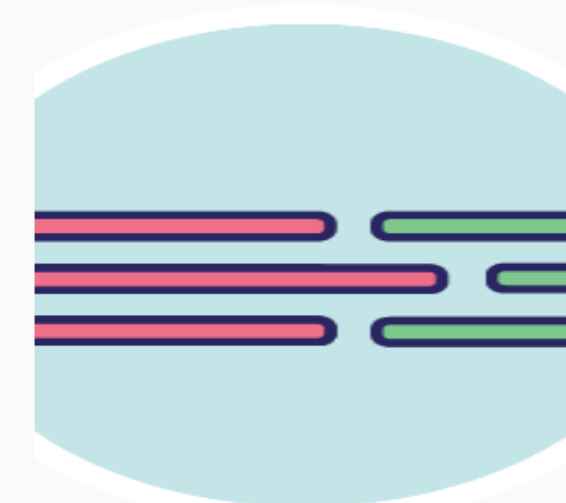
NEW! Sleep Data



11,350+

Structural Variants

NEW! In 2023



1,000+

Long-Read Sequences


NEW! In 2023

You Don't Need IRB to use the All Of US


Consent and EHR Authorization



Consent and EHR Authorization



Participant Surveys



Physical Measurements

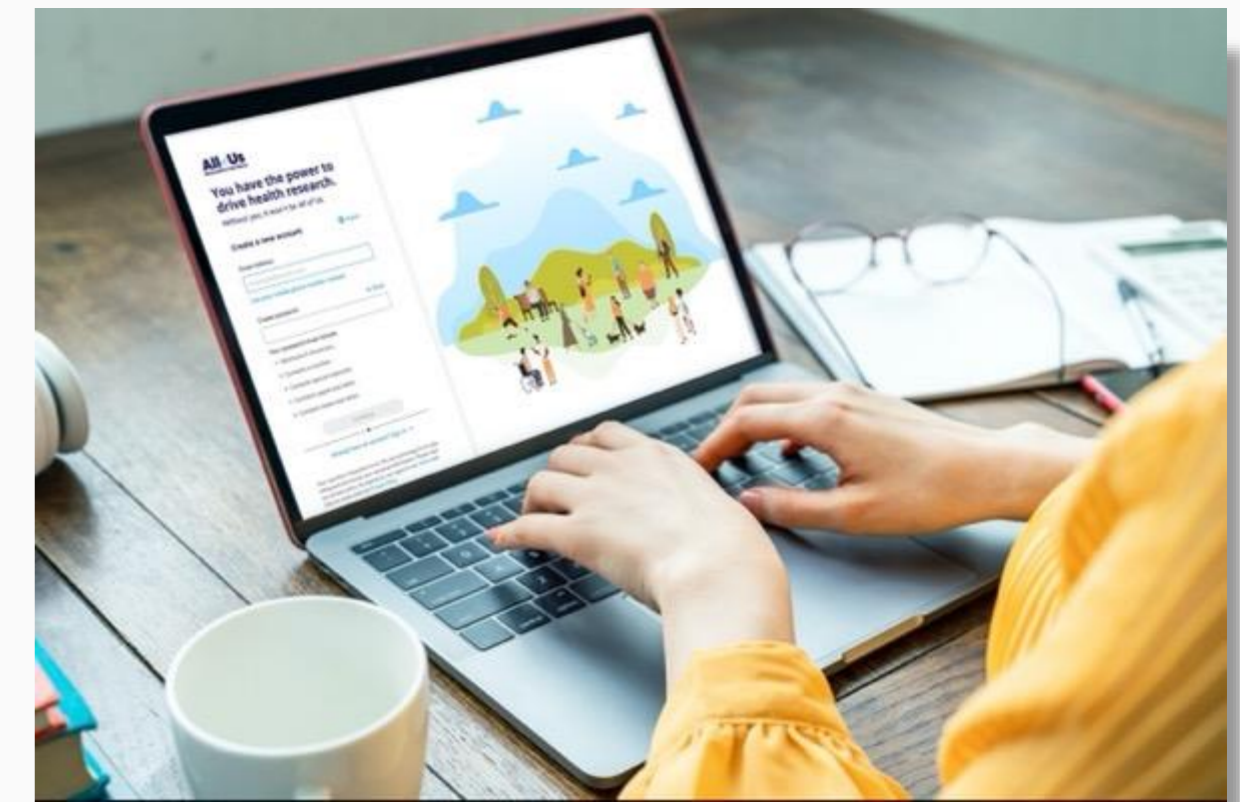


Biosamples



Mobile/Wearable Tech

- Participants must be 18 years or older
- Online video consent
- Consent process includes authorization to share EHR data with researchers



Initial Data Types	Expanded Data Types (May Include)
<ul style="list-style-type: none">• Demographics• Visits• Diagnoses• Procedures• Medications• Laboratory visits• Vital signs	<ul style="list-style-type: none">• Clinical notes• Radiology, cardiology, and other reports• Mental health reports• Substance abuse, alcohol use, and tobacco use• More laboratory results, potentially including genomics

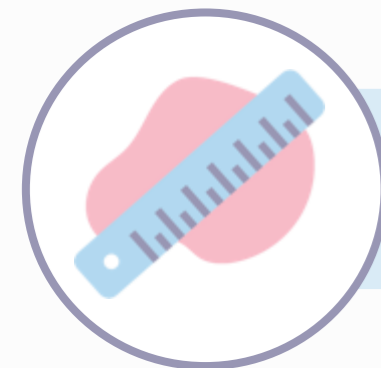
Participant Surveys



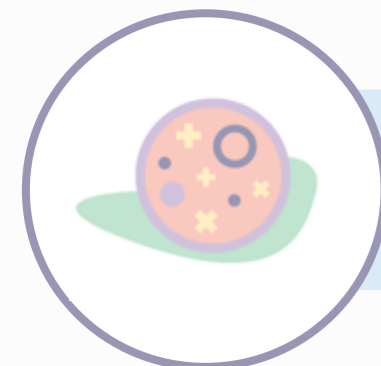
Consent and
EHR Authorization



Participant Surveys



Physical Measurements



Biosamples



Mobile/Wearable Tech

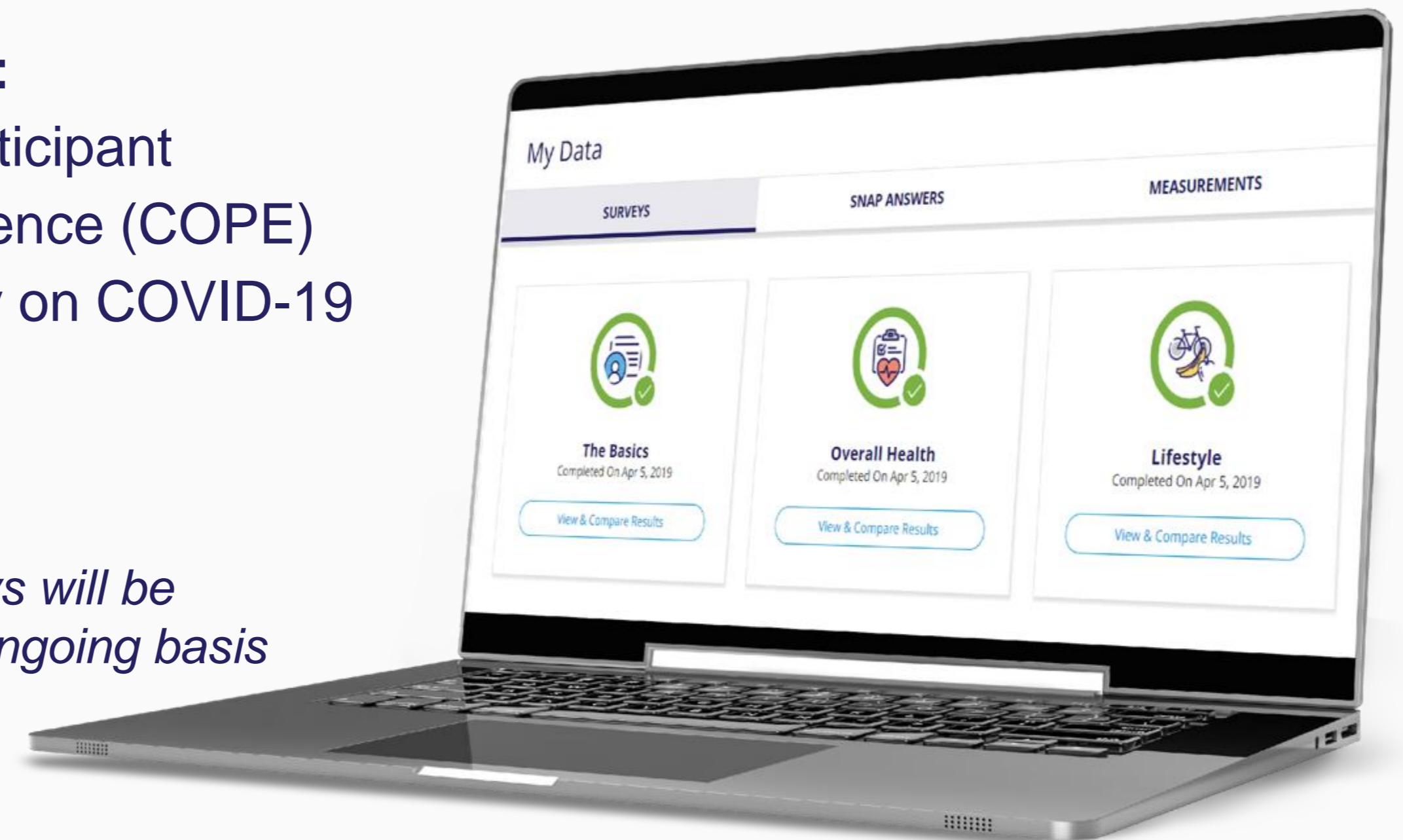
Open Surveys:

- The Basics
- Overall Health
- Lifestyle
- Health Care Access & Utilization
- Personal & Family Health History
- Social Determinants of Health

Closed Surveys:

- COVID-19 Participant Survey Experience (COPE)
- Minute Survey on COVID-19 Vaccines

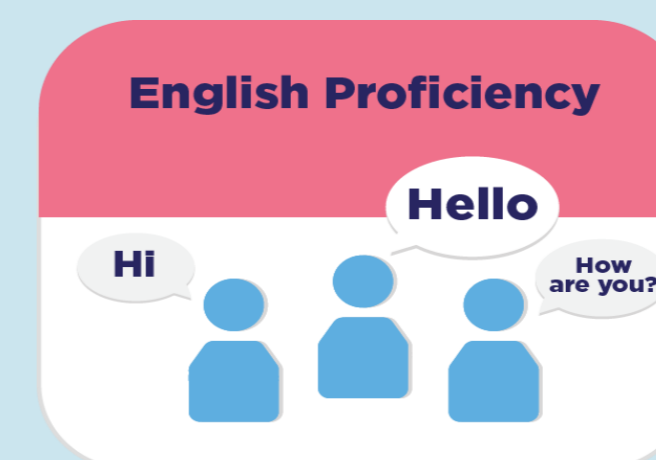
Additional surveys will be released on an ongoing basis



Social Determinants of Health Survey

By connecting biological and social determinants of health data on a large, inclusive scale and following participants as they move, age, and grow, the *All of Us* dataset is driving new insights into health and disease.

Social Determinants of Health (SDOH) Survey data



from 117,750+ responses

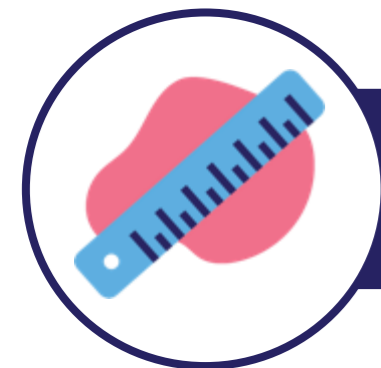
Physical measurements and Biosamples



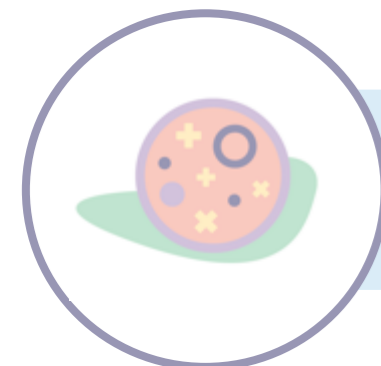
Consent and
EHR Authorization



Participant Surveys



Physical Measurements



Biosamples



Mobile/Wearable Tech

Current Measurements:

- Blood pressure
- Heart rate
- Height
- Weight
- BMI
- Hip circumference
- Waist circumference

Biosamples:

- Blood
- Saliva
- Urine

All of Us

Thank you for taking part in the All of Us Research Program. By sharing your information, you're helping shape the future of health care. This form has your physical measurements from your visit today.

Date of Visit: _____

Height: _____ Weight: _____ Body Mass Index (BMI): _____

Circumference: _____

Waist Circumference: _____

Blood Pressure (Systolic/Diastolic): _____ / _____

Heart Rate (Beats per Minute): _____

Adult Body Mass Index (BMI) Groupings:

underweight normal overweight obese

(These apply to both men and women.)

I will see blood pressure and heart rate information on the right. This is to give you a broad sense of what is thought to be "normal" for an average person. Your "normal" may differ from this for many reasons. These reasons may include your age, level of fitness, and general health concerns or questions about your measurements? Please ask your health care provider or contact the All of Us Support Center at 1-844-842-2855 or help@joinallofus.org.

National Institutes of Health offers many resources to help people learn more about heart health. It also has tools to help people maintain a healthy weight.

Visit: <https://www.nhlbi.nih.gov/health>

Normal Blood Pressure Range:

90-120

60-80

Normal Heart Rate Range:

60-100

Our preliminary findings suggest a potential concern with your blood pressure _____ / _____ or heart rate _____.

We recommend an evaluation by a health care provider as soon as possible.

Joinallofus.org



Tiered access levels enable discovery



Available to anyone

Public Tier

Anyone can visit ResearchAllofUs.org (the *All of Us* Research Hub) to learn more about the data available for research and explore aggregated participant data and summary statistics, with participant identifiers removed. Public resources include:

- **Data Snapshots:** Aggregated, public-facing overviews of participant characteristics and data types
- **Data Browser:** Interactive preview into the *All of Us* dataset through public-facing aggregate data
 - Currently includes participant-provided survey responses, physical measurements, data from EHRs and wearables, and genomic data
- **Survey Explorer:** Details the questions included in each of the surveys
- **Research Projects Directory:** Descriptions of each research project within the Researcher Workbench

RESEARCHER WORKBENCH

Registered Tier

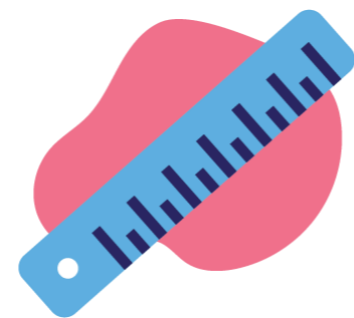
Registered researchers can access in-depth data and a variety of research tools to conduct a wide range of studies.



Surveys



Electronic Health Records



Physical Measurements



Wearables

Data have been processed to protect participant privacy

Controlled Tier

Registered researchers with amended institutional agreements can access all of the data in the Registered Tier plus additional and expanded data types, including genomic data, real dates of health events, ICD codes, granular demographic data, and more.



Genomics



Health and Lifestyle surveys

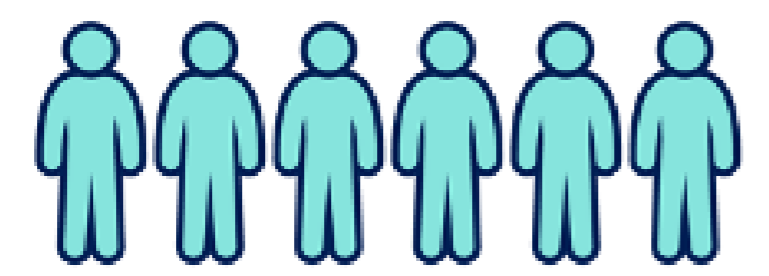
Tiered access to *All of Us* data

Via the Research Hub (Data Browser)



Open access

Level of access



How to access
Available to public. No requirements need.

Via the Researcher Workbench

R Registered Tier



Registered access

Level of access



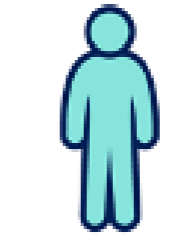
How to access
Researchers can obtain the data for any purpose; however, they need to register their information and may need to be monitored.

C Controlled Tier



Controlled access

Level of access



How to access
Researchers must describe their research purpose to special data access committee, who then evaluate the consistency of the research purpose with the research participant's consent. The researcher can only share the data after receiving the committee's approval.

The *All of Us* Research Hub



Open access

Level of access



How to access

Available to public. No requirements need.

Reminder:

Research Hub is
accessed by the public

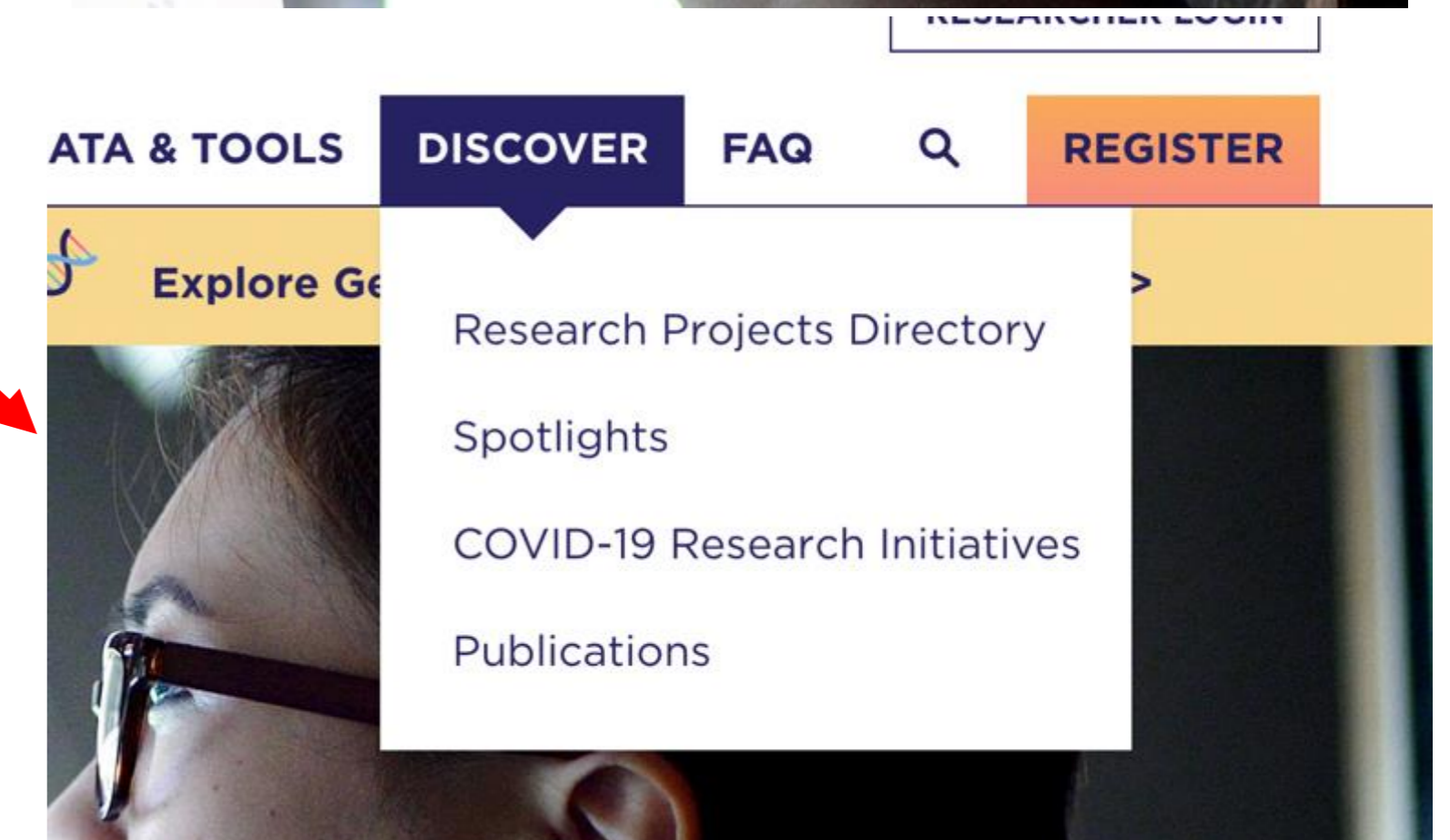
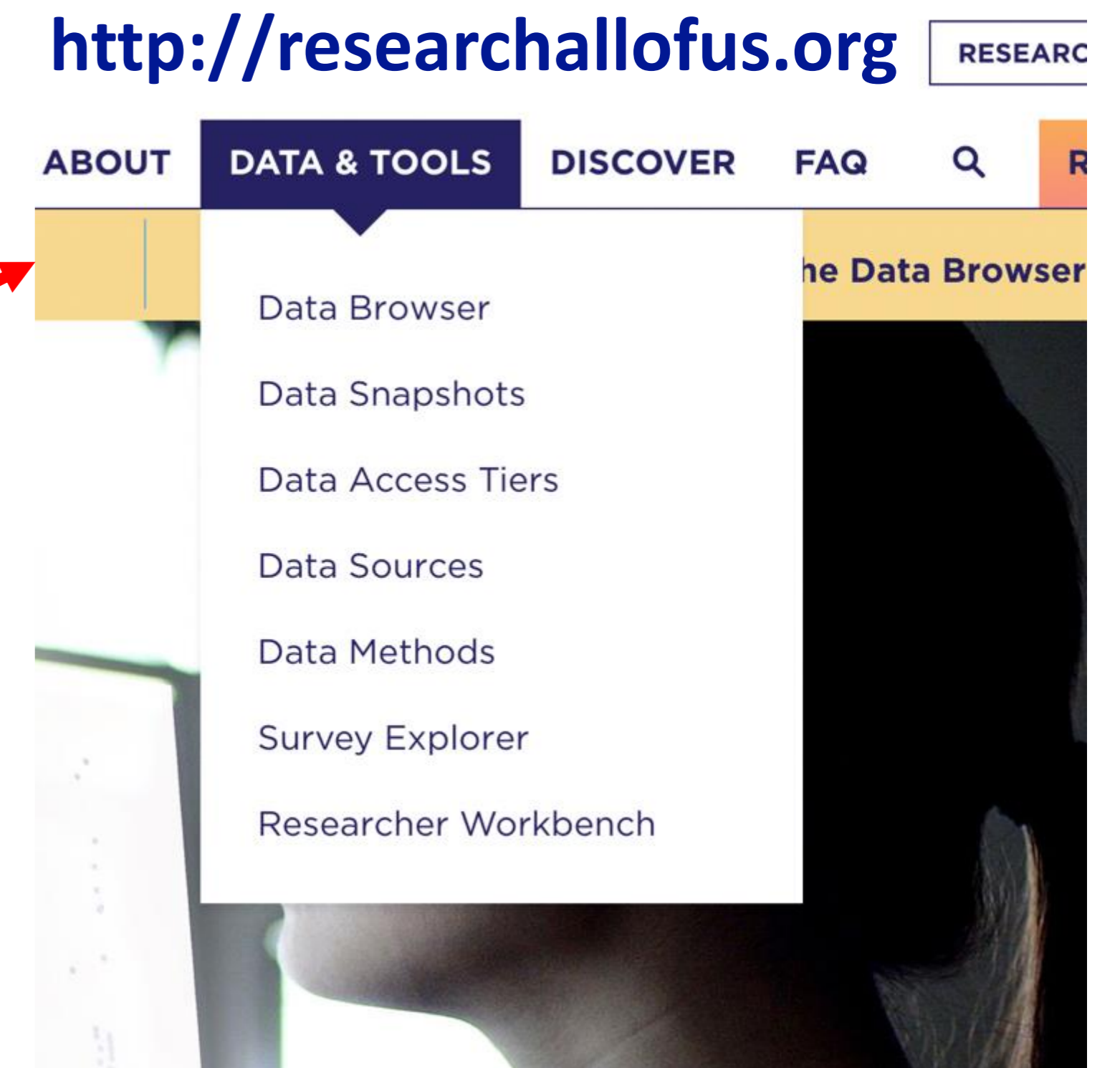
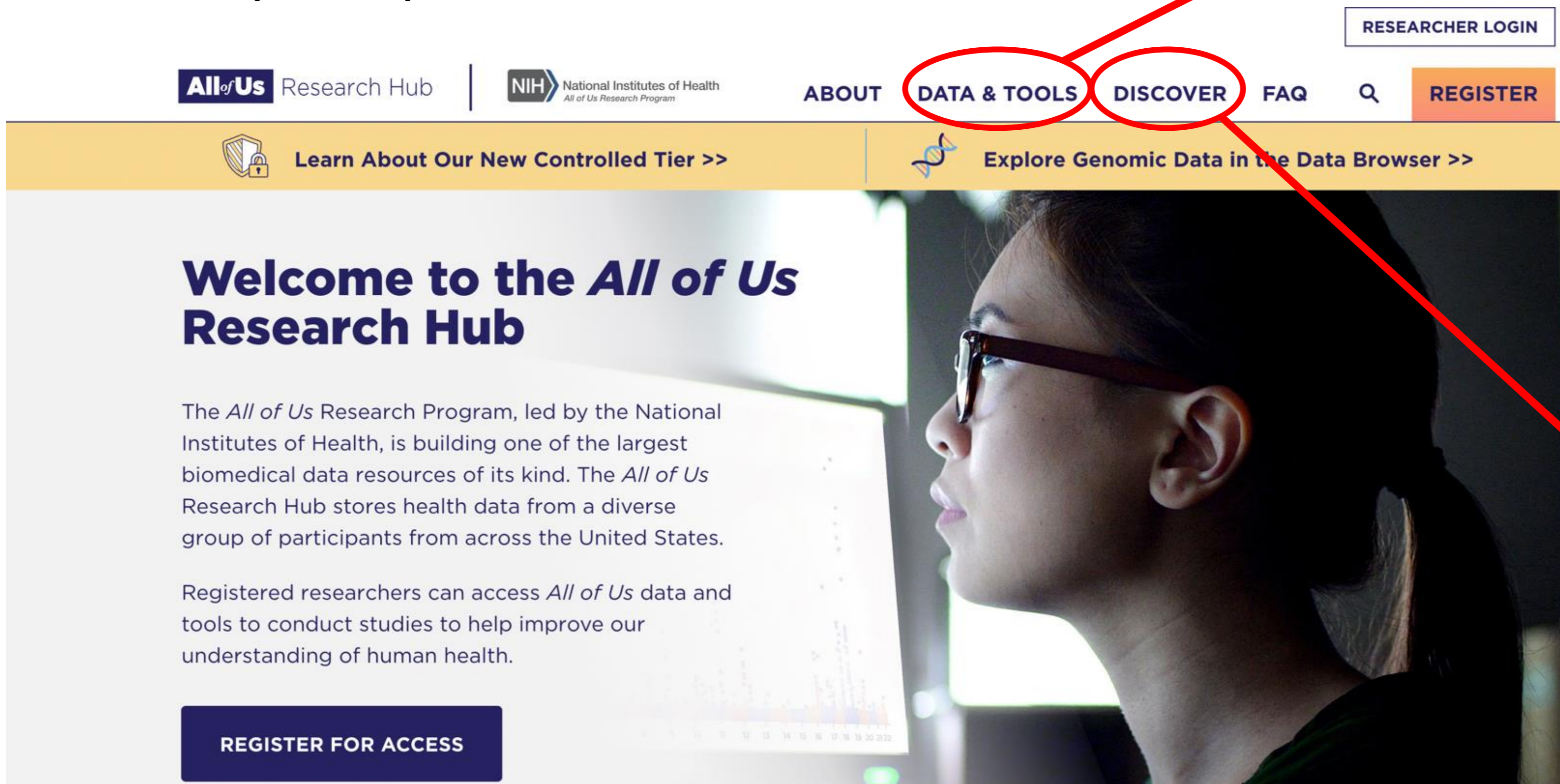
at

researchallofus.org

<http://researchallofus.org>

Use the Research Hub to....

- A. Explore the data!
- B. Explore others' projects with this data
- C. Explore publications with this data



Example pages on the Research Hub...

Explore
the data

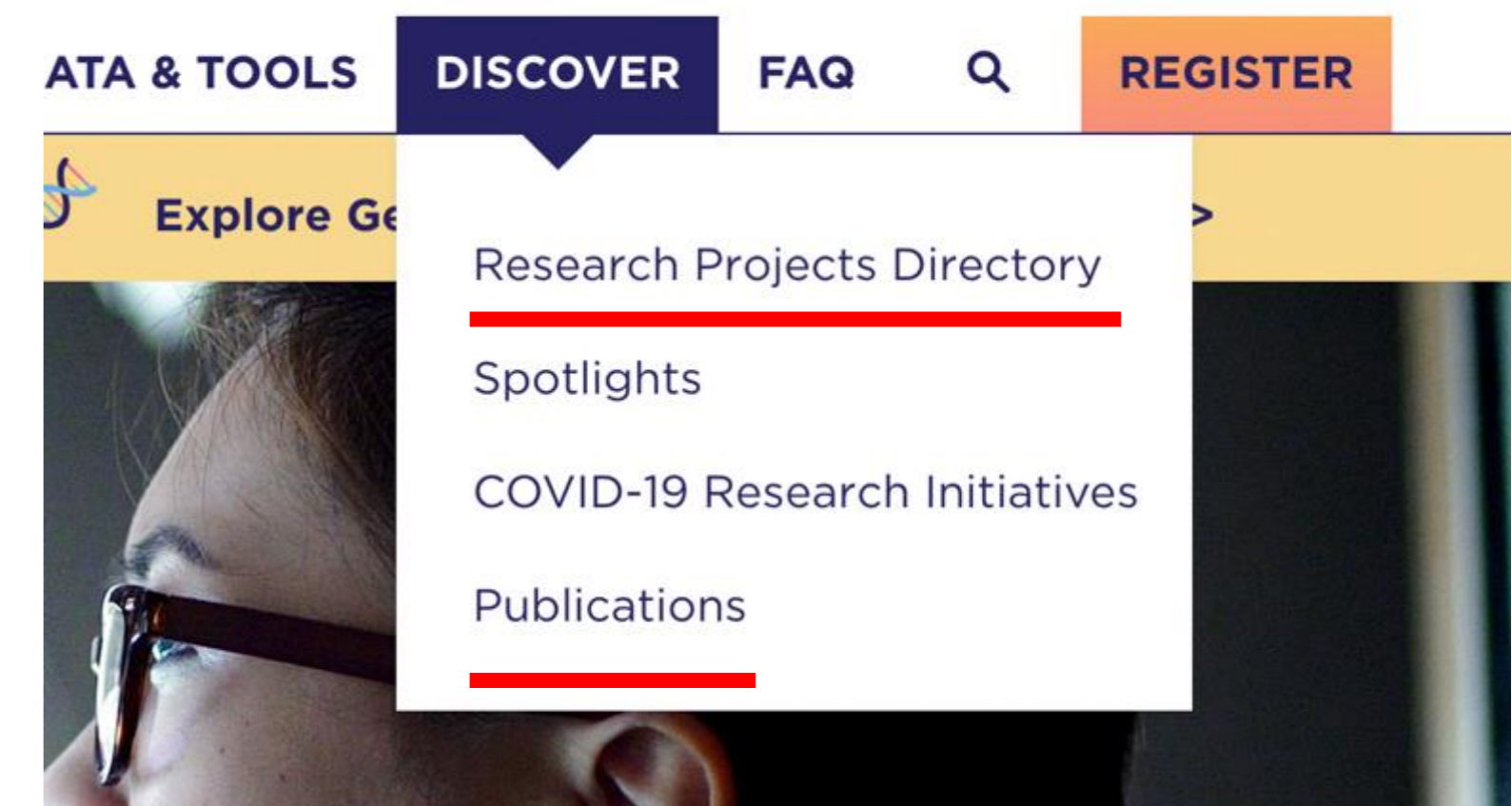
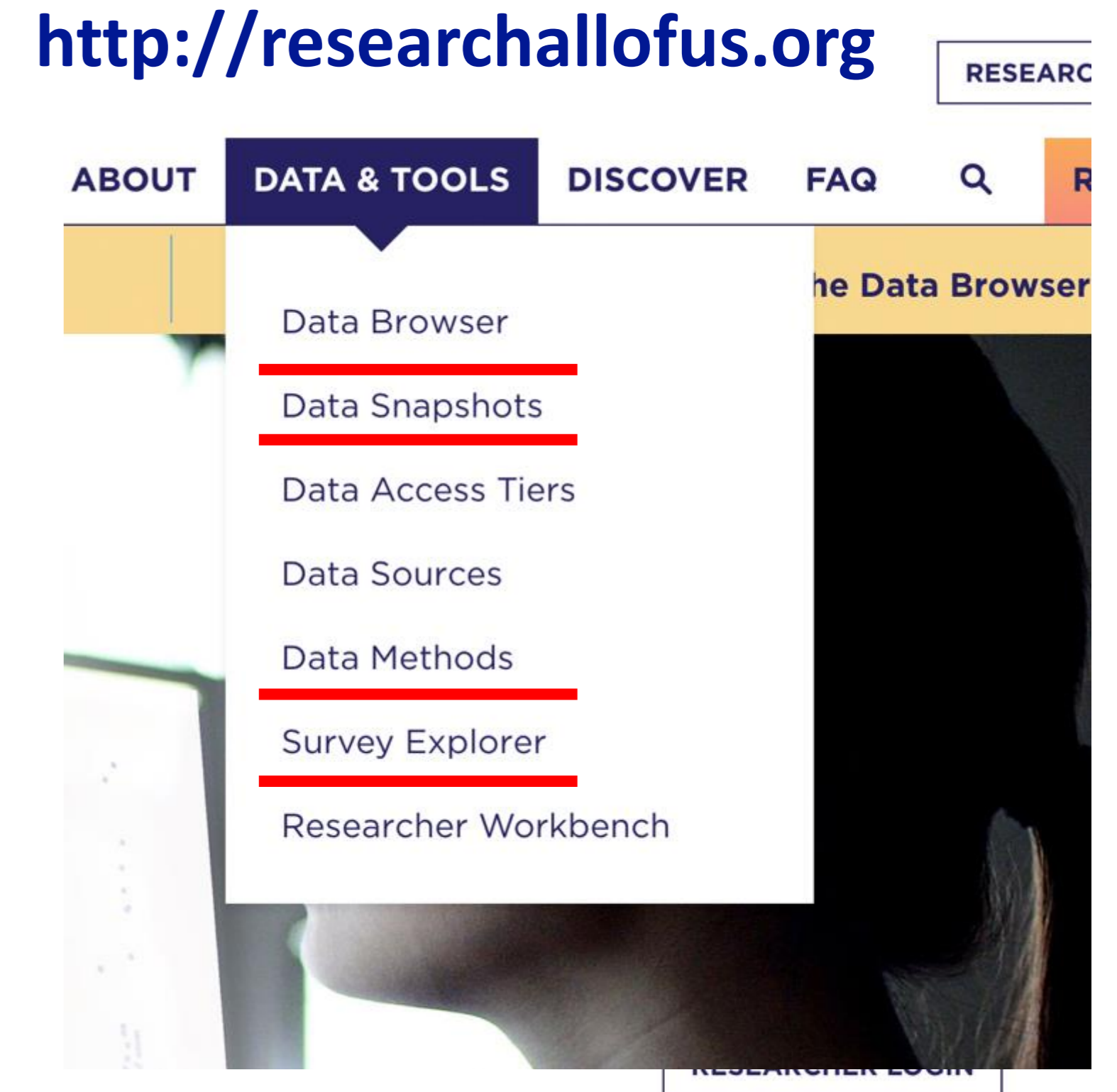
- Data Browser
 - Search for and view many details on types of data available
- Data Snapshots
 - Visual summary of participant characteristics
- Data Methods
 - Methodology of the data curation
- Survey explorer
 - View details of surveys

Explore others'
projects with
this data

- Research Projects Directory
 - View all current workspaces

Explore
publications
with this data

- Publications
 - View publications



Explore others work: Research Projects Directory

<https://www.researchallofus.org/research-projects-directory/>

Example of what you see when you click on a project:

Research Projects Directory

1,256 ACTIVE PROJECTS

This information was updated 3/28/2022

The Research Projects Directory includes information about all projects that currently exist in the Researcher Workbench to help provide transparency about how the Workbench is being used. Each project specifies whether [Registered Tier](#) or [Controlled Tier](#) data are used.

Note: Researcher Workbench users provide information about their research projects independently. Views expressed in the Research Projects Directory belong to the relevant users and do not necessarily represent those of the All of Us Research Program. Information in the Research Projects Directory is also cross-posted on [Allofus.nih.gov](https://allofus.nih.gov) in compliance with the 21st Century Cures Act.

Search By: ▼ Project title: enter keywords you are looking for 🔍

SDHA in Eye Conditions - v5 Dataset ▼

We are planning to explore disparities in healthcare access and utilization for patients with eye conditions across different demographic groups. We would like to evaluate risk of developing advanced/severe disease in different eye conditions, and understand how social determinants contribute...

Added Value of Fitbit Data in Fall Risk Prediction ▼

Fall can threaten older patients' safety after they are discharged from emergency departments (EDs). Studies suggest that moderate physical exercise can reduce risks of fall for older people. Smartwatch can track users' physical exercise records but no research has investigate...

Psm11 polymorphisms ▼

Psm11 encodes the $\beta 5t$ subunit of the thymoproteasome, which is specifically expressed in cortical thymic epithelial cells (cTECs), and which is essential for the optimal positive selection of functionally competent CD8+ T cells in mice. We have recently noticed that...

GWAS and admixture mapping of moderate to severe asthma in African Americans ⤴

SCIENTIFIC QUESTIONS BEING STUDIED

To identify genetic variants that may contribute to moderate and severe asthma among African Americans. The findings may help inform racial ancestry disparities in moderate to severe asthma, guide personalized medicine and improve public health of minority populations in the U.S.

PROJECT PURPOSE(S)

- Disease Focused Research (Asthma)

SCIENTIFIC APPROACHES

GWAS and admixture mapping. Logistic regression to test for an association moderate to severe asthma and allele dosage at each individual SNP, adjusting for age, sex, body mass index, and both global and local African ancestry.

ANTICIPATED FINDINGS

Since genetic variations that contribute to moderate and severe asthma in African Americans are largely undefined, we hope to identify variants that are specific to this group.

DEMOGRAPHIC CATEGORIES OF INTEREST

- Race / Ethnicity
- Age

DATA SET USED

Controlled Tier

RESEARCH TEAM

Owner:

- [Angelico Mendy](#) - Early Career Tenure-track Researcher, University of Cincinnati

Search and see ALL the active projects (workspaces) currently using the All of Us data!

Explore any condition: Data Browser

Search: diabetes

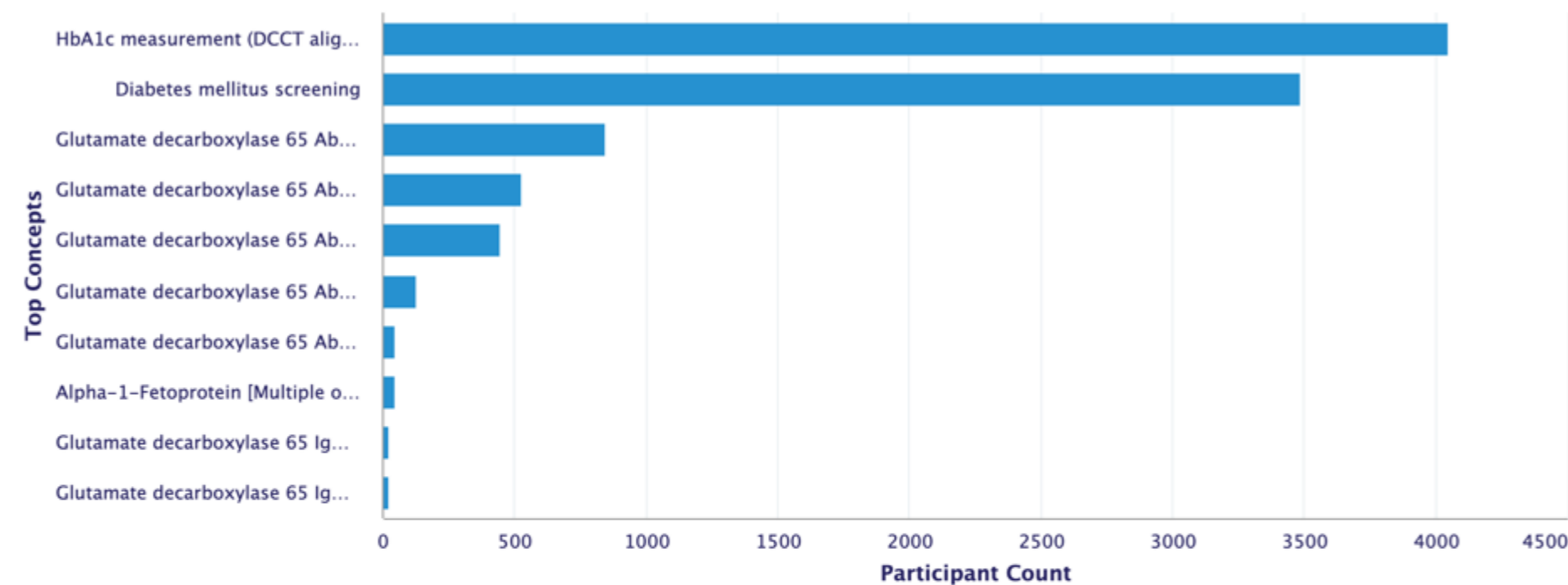
Data includes 409,420 participants as of 2/15/2023.

FAQs In

EHR Domains

Domain	Matching Medical Concepts	Participants
Conditions	240	254,700
Labs & Measurements	12	255,640
Procedures	6	242,580

Top 10 Labs & Measurements by Descending Participant Counts



12 matching medical concepts

Interested in general health information related to "diabetes"? Search MedlinePlus

Labs & Measurements	Participants of 255,640	% of 255,640	Data Type
1. HbA1c measurement (DCCT aligned)	4,040	1.58 %	

Also Known As: Hem... Screenshot measurement aligned to the Diabetes Control and Complications Trial (procedure), Hemo... See More

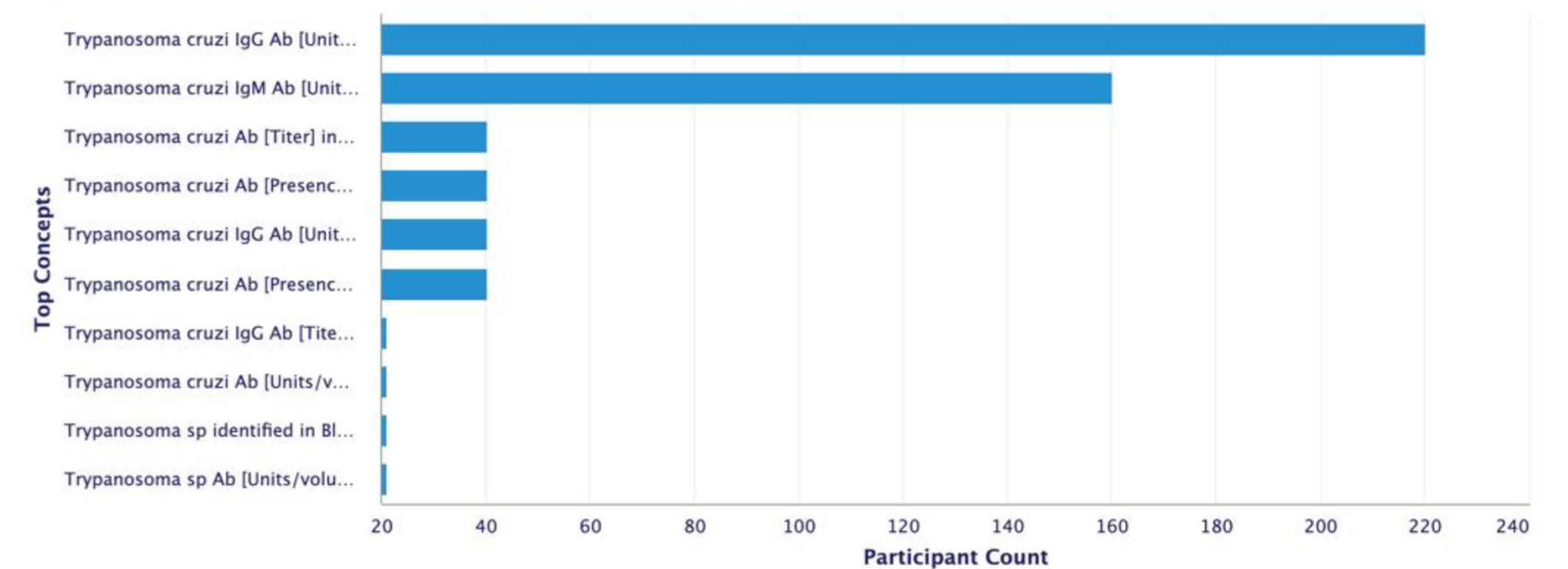
Search: chagas

Data includes 409,420 participants as of 2/15/2023.

EHR Domains

Domain	Matching Medical Concepts	Participants
Conditions	7	254,700
Labs & Measurements	15	255,640

Top 10 Labs & Measurements by Descending Participant Counts



15 matching medical concepts

Interested in general health information related to "chagas"? Search MedlinePlus

Labs & Measurements	Participants of 255,640	% of 255,640	Data Type
1. Trypanosoma cruzi IgG Ab [Units/volume] in Serum	220	0.09 %	

The *All of Us* Researcher Workbench



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



Workspaces +

Introductory example of G WAS with type 2 diabetes phenotype

OWNER

Last Changed: 11/11/22, 03:58 PM



Studies of Autosomal Dominant Polycystic Kidney Disease (ADPKD)

OWNER

Last Changed: 12/17/22, 09:14 AM

Exploring Hypertension data types

OWNER

Last Changed: 05/31/22, 05:16 PM

Recently Accessed Items

Item type ↑↓	Name ↑↓	Workspace name ↑↓	Last Modified Date ↑↓	Dataset	Last
	<input type="text" value="Search Name"/>				
Concept Set	antihypertensive	Exploring Hypertensio...	Dec 8, 2022	All of Us Registered Tier Dataset v5	juli
Notebook	Analysis of beta blocke...	Exploring Hypertensio...	Dec 7, 2022	All of Us Registered Tier Dataset v5	



Registered access

Level of access



How to access

Researchers can obtain the data for any purpose; however, they need to register their information and may need to be monitored.

Controlled access

Level of access



How to access

Researchers must describe their research purpose to special data access committee, who then evaluate the consistency of the research purpose with the research participant's consent. The researcher can only share the data after receiving the committee's approval.

Researcher Workbench is
only accessed by registered researchers at
workbench.researchallofus.org

<http://workbench.researchallofus.org>

Register to be an *All of Us* Researcher



CONFIRM YOUR INSTITUTION'S AGREEMENT

Before you can create an account, your institution must have a Data Use and Registration Agreement (DURA) in place with *All of Us*. [Confirm DURA](#).



CREATE AN ACCOUNT AND VERIFY IDENTITY

After creating your Researcher Workbench account, you will be asked to verify your identity through login.gov. [Learn more](#).



COMPLETE THE MANDATORY TRAINING

The training focuses on conducting responsible and ethical research using the Researcher Workbench. Additional training is required to access the Controlled Tier. [Learn more](#).

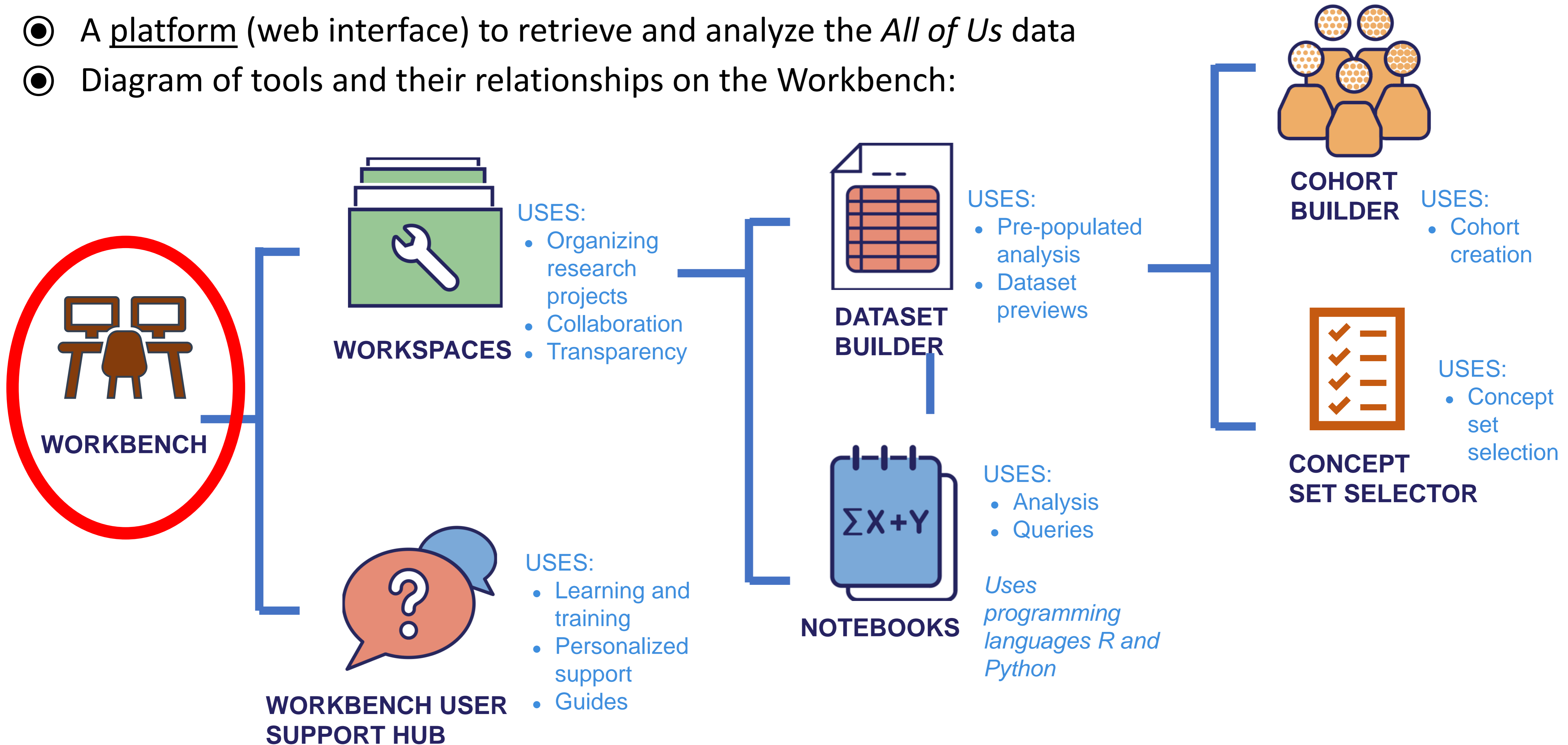


SIGN THE DATA USER CODE OF CONDUCT (DUCC)

This agreement outlines the program's expectations for researchers who use the Researcher Workbench and describes how program data may be used. [View the DUCC](#).

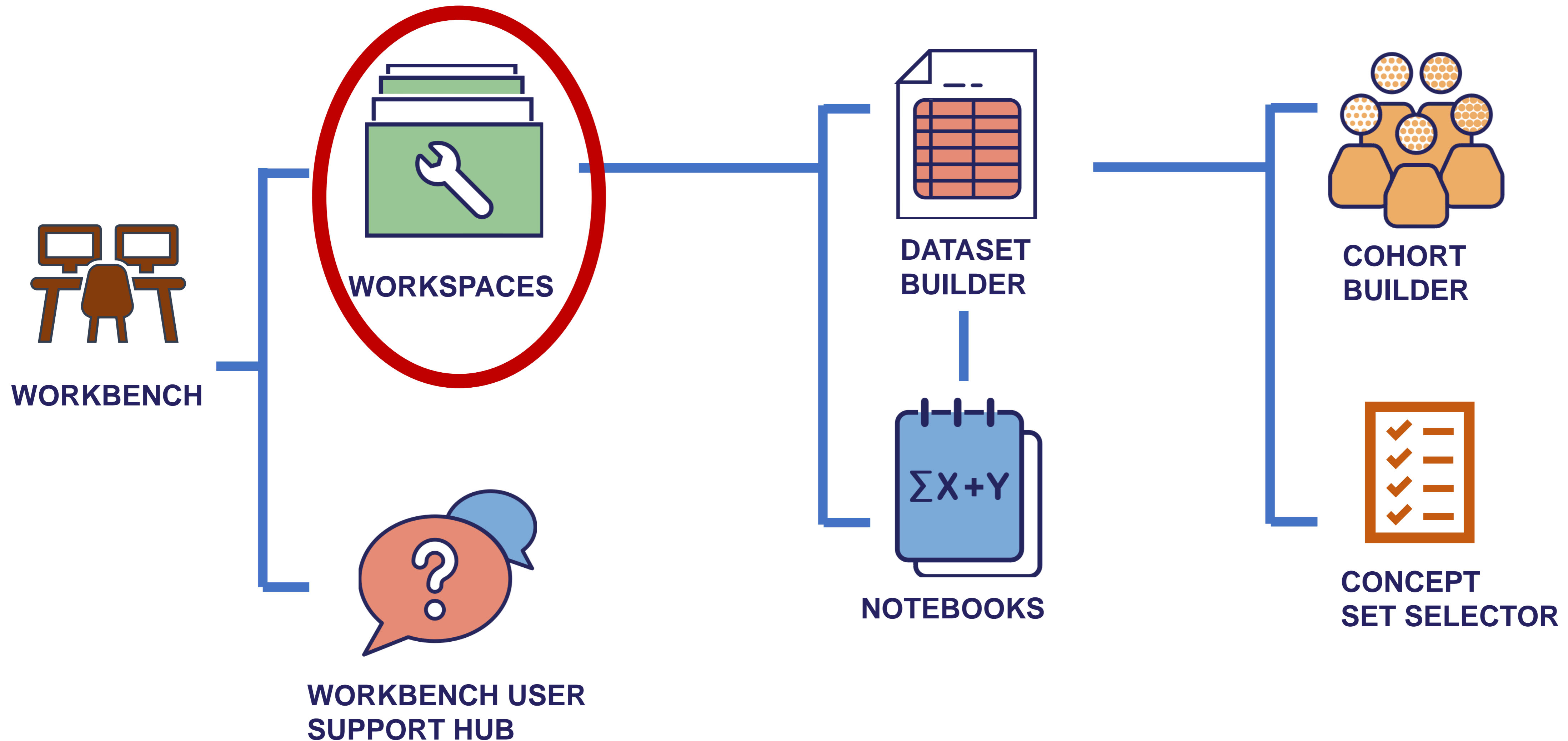
What is the *All of Us* Research Workbench?

- A platform (web interface) to retrieve and analyze the *All of Us* data
- Diagram of tools and their relationships on the Workbench:



What are these tools on the Workbench?

- Workspace – online space for the datasets and analyses (notebooks) of an individual project



View of a workspace when opened



Cohorts +

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

All of Us Participants → Your Cohort

- Participant ID 1
- Participant ID 2
- Participant ID 3

Datasets +

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

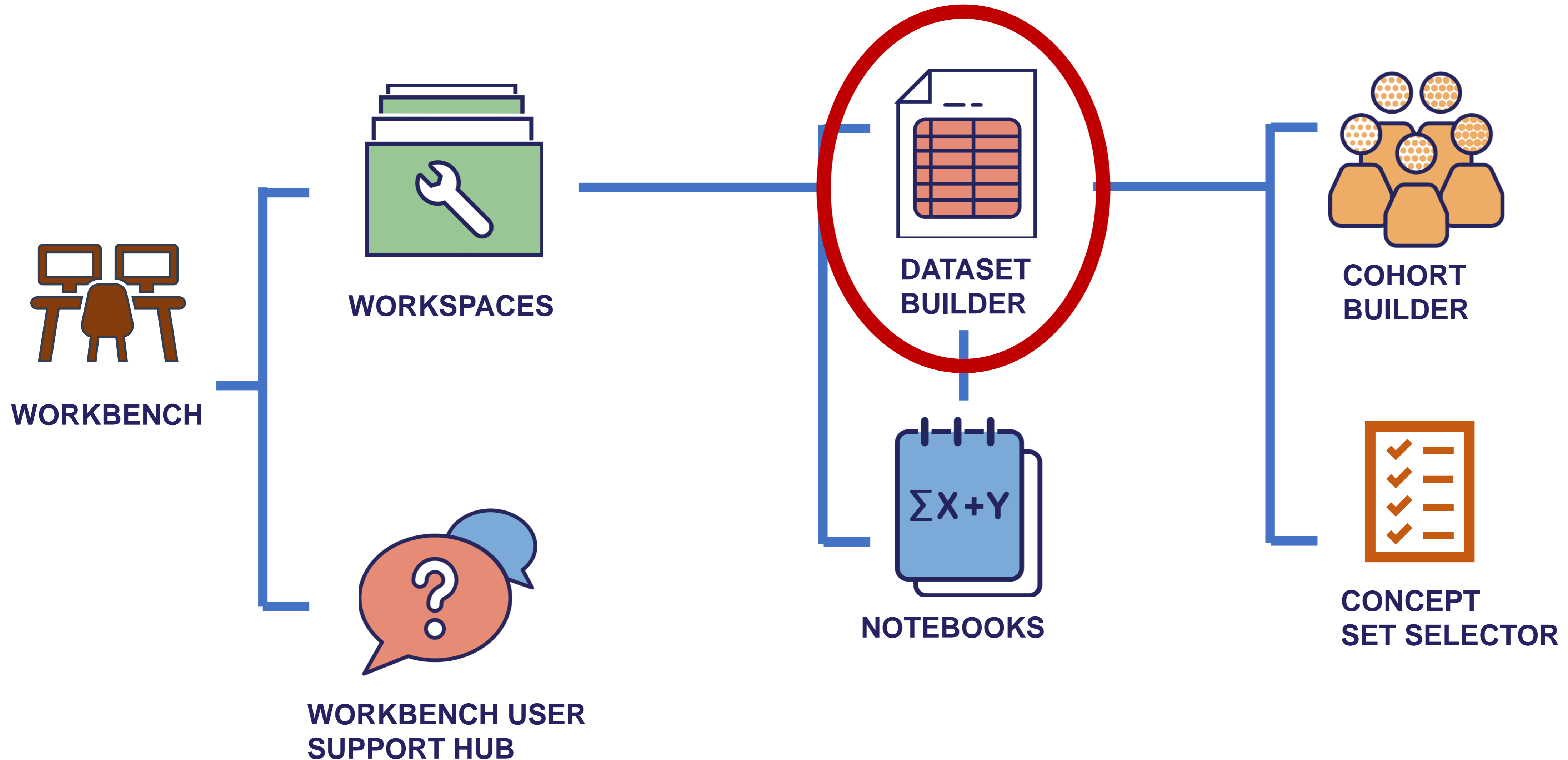
Your Cohort + Data About Your Cohort = Your Dataset

ID 1	Med 1	Labs 1
ID 2	Med 2	Labs 2
ID 3	Med 3	Labs 3



What are these tools on the Workbench?

- Dataset builder – tool developed to retrieve desired datasets of the *All of Us* data for analysis



View of the Dataset Builder



Datasets

Build a dataset by selecting the variables and values for one or more of your cohorts. Then export the completed dataset to Notebooks where you can perform your analysis

1 Select Cohorts (Participants)

Prepackaged Cohorts

All Participants

Workspace Cohorts

ADPKD participants age 18-65

2 Select Concept Sets (Rows)

Fitbit Activity Summary

Fitbit Heart Rate Level

Fitbit Intra Day Steps

Workspace Concept Sets

Transplant of kidney

3 Select Values (Columns)

Select All

Procedure

person_id

procedure_concept_id

standard_concept_name

[Learn more in the data dictionary](#)

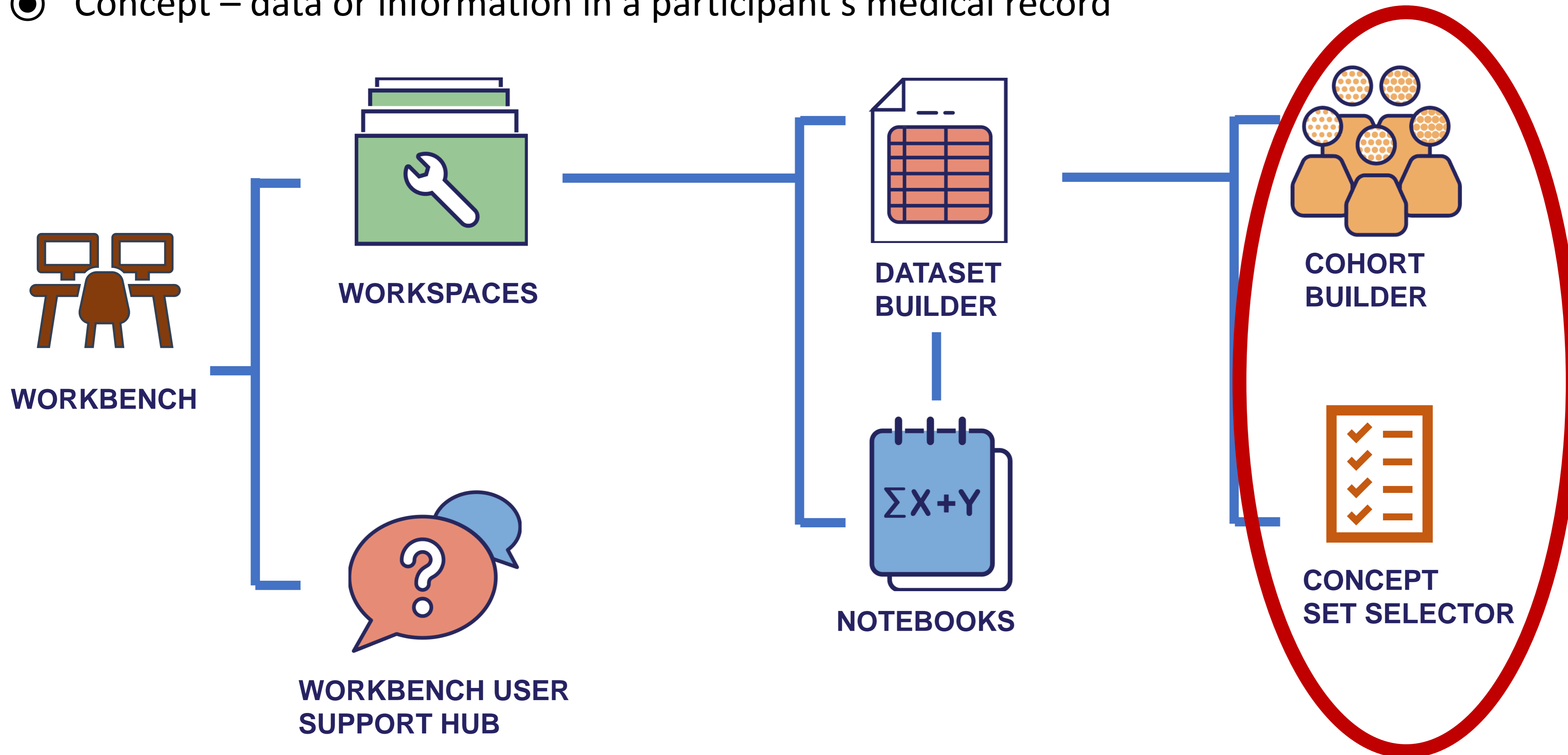
4 Preview Dataset

A visualization of your data table based on concept sets and values you selected above.
Once complete, export for analysis

[View Preview Table](#)

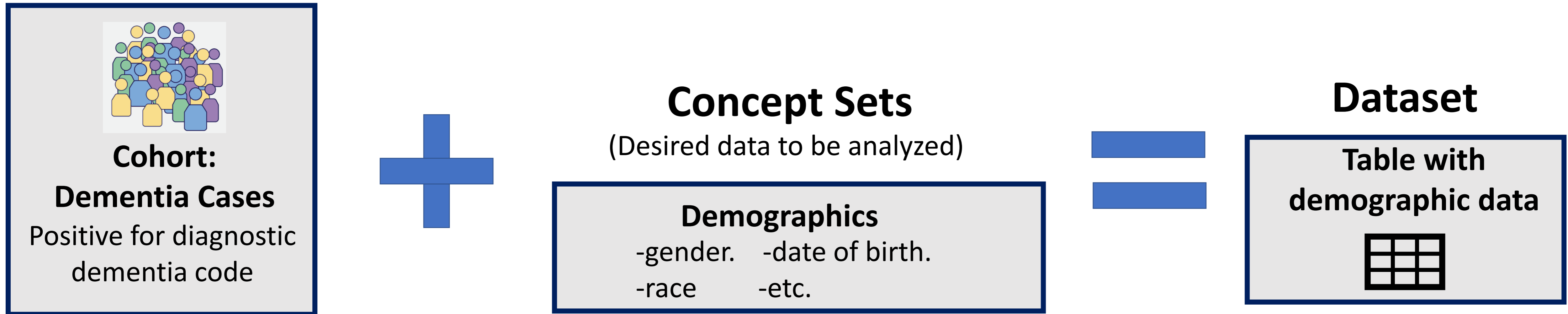
What are these tools on the Workbench?

- Cohort – the group of participants a researcher is interested in
- Concept – data or information in a participant's medical record



Example design of a dataset for dementia

- Together cohorts and sets of concepts create a dataset



View of building and adding cohorts and concept sets for a dataset

Click the + buttons next to 'Select Cohorts' and 'Select Concept Sets' to build and add them

Datasets - Dementia Dataset

Build a dataset by selecting the variables and values for one or more of your cohorts. Then export the completed dataset to Notebooks where you can perform your analysis

1 Select Cohorts (Participants) +

Prepackaged Cohorts

- All Participants

Workspace Cohorts

- Dementia Cohort 

Build and add cohorts

2 Select Concept Sets (Rows) +

Prepackaged Concept Sets

- Demographics
- All Surveys
- Fitbit Heart Rate Summary
- Fitbit Activity Summary

Build and add concept sets

3 Select Values (Columns) Select All

Person

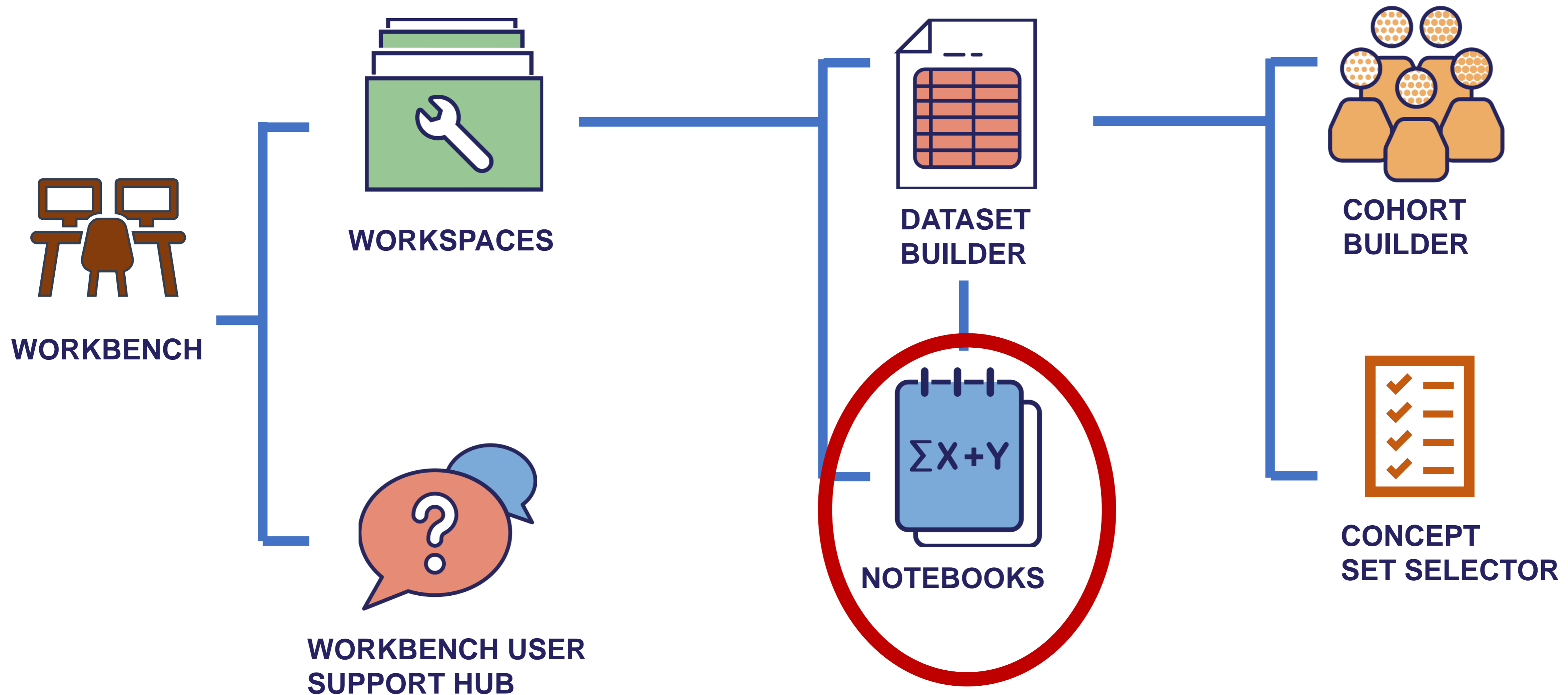
- person_id >
- gender_concept_id >
- gender >

[Learn more in the data dictionary](#)

4 Preview Dataset A visualization of your data table based on concept sets and values you selected above. Once complete, export for analysis View Preview Table

What are these tools on the Workbench?

- Jupyter Notebook – online application for computation, such as live coding, analysis, visualization, and text; is used to analyze a dataset



View of the *All of Us* Jupyter Notebook

- Python and R - only languages supported by *All of Us* Jupyter Notebooks



Workspaces > Quick Demo of Plots and Analyses > Notebooks >
R demo

jupyter R demo

File Edit View Insert Cell Kernel Navigate Widgets Help Snippets Trusted

+ 🔍 📄 📄 ⬆️ ⬆️ ▶ Run ■ ↺ ▶ Markdown ⌨️ ⌚ nbdiff ☰

Contents 🔄 ⚙️

- ▼ 1 Setup
 - 1.1 How to install software packages not pre-installed
 - 1.2 How to import software packages installed
 - 1.3 How to select the Curated Data Repository (CDR) for
 - 1.4 How to download data from BigQuery
- ▼ 2 Data Availability
 - 2.1 How many participants have each data type
- 3 Example Query
- 4 Participant count by state of residence

Adaptation of "Data 101: Data Fundamentals" Notebook from "How to Get Started with Registered Tier Data (tier 5)" Tutorial Workspace for the 2022 UBR Faculty Summit

This tutorial is divided into the following sections:

1. **Setup:** How to set up this notebook, install and import software packages, and select the correct version of the CDR.
2. **Data Availability:** How to summarize the number of unique participants with data present across the major data types: Physical Measurements, Surveys, and EHR.
3. **Example Query:** How to directly query the CDR to extract demographic data.

▼ 1 Setup

How to set up this notebook, install and import software packages, and select the correct version of the CDR.

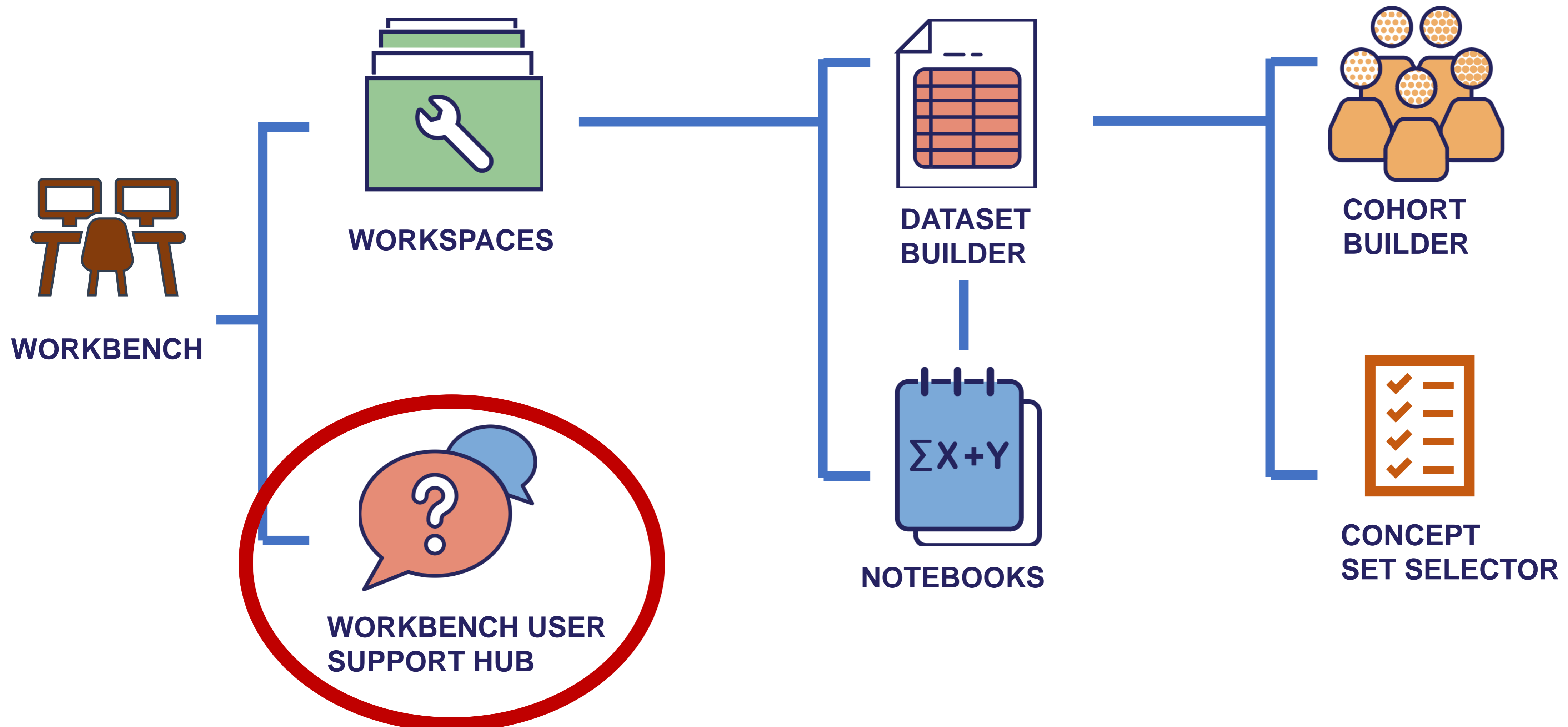
▼ 1.1 How to install software packages not pre-installed

You may need or want to install software packages for your analysis that are not installed by default.

```
In [12]: install.packages("usmap")
install.packages("viridis")
```

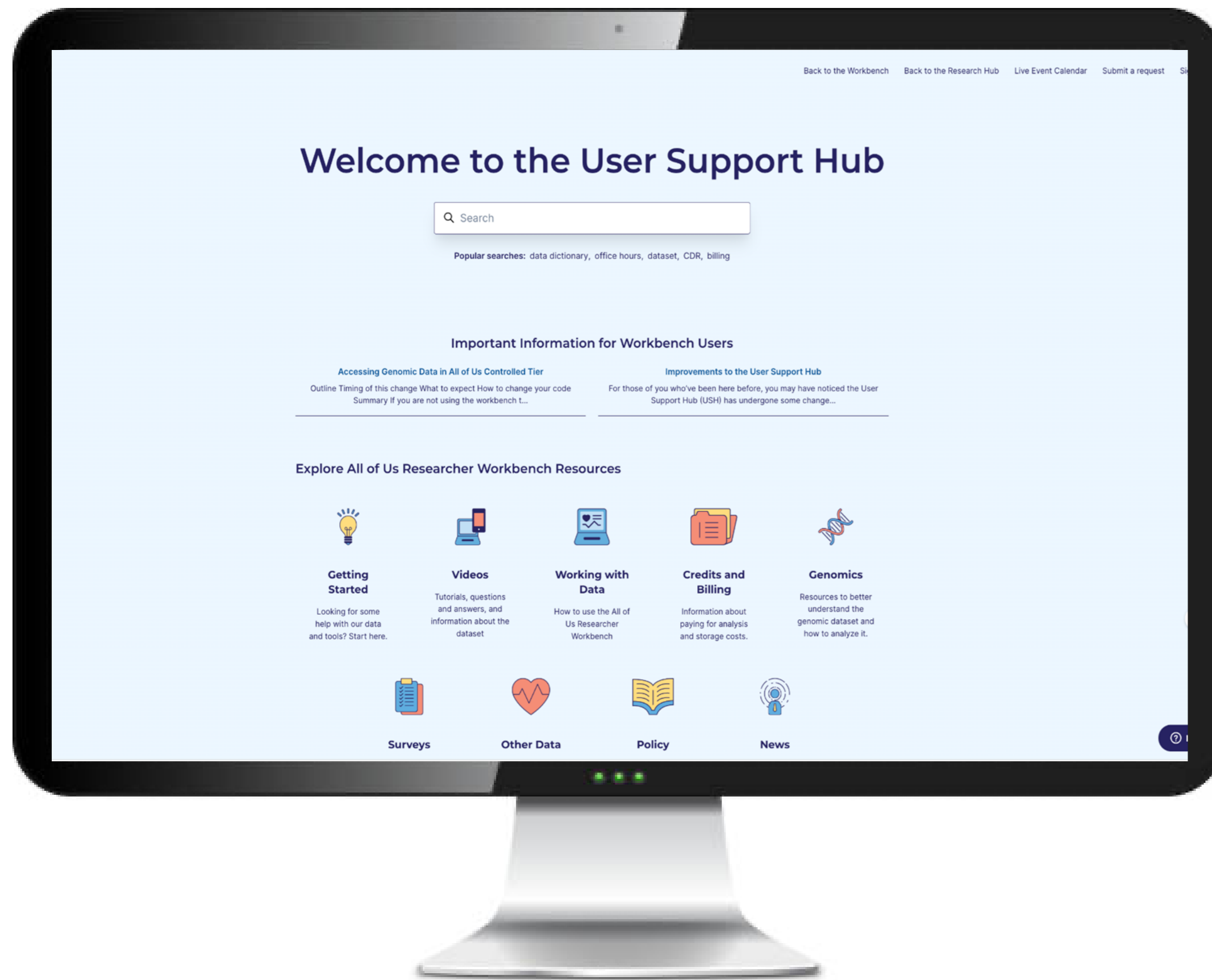
What are these tools on the Workbench?

- User Support Hub – central website with several types of resources, such as articles and videos, to enable effective use of the Workbench



User Support Hub offers resources to support your research

No Login Required! Visit the Support Hub today to find answers to common questions about becoming a registered researcher, using the *All of Us* dataset, and more.



Find instructional materials about the *All of Us* Researcher Workbench

- Includes video tutorials, educational resources, release notes, and more

Search 290+ articles

- Find information about data dictionaries, the Controlled Tier directory, how WGS and Array data are organized, and more

Connect with experts during weekly LIVE office hours

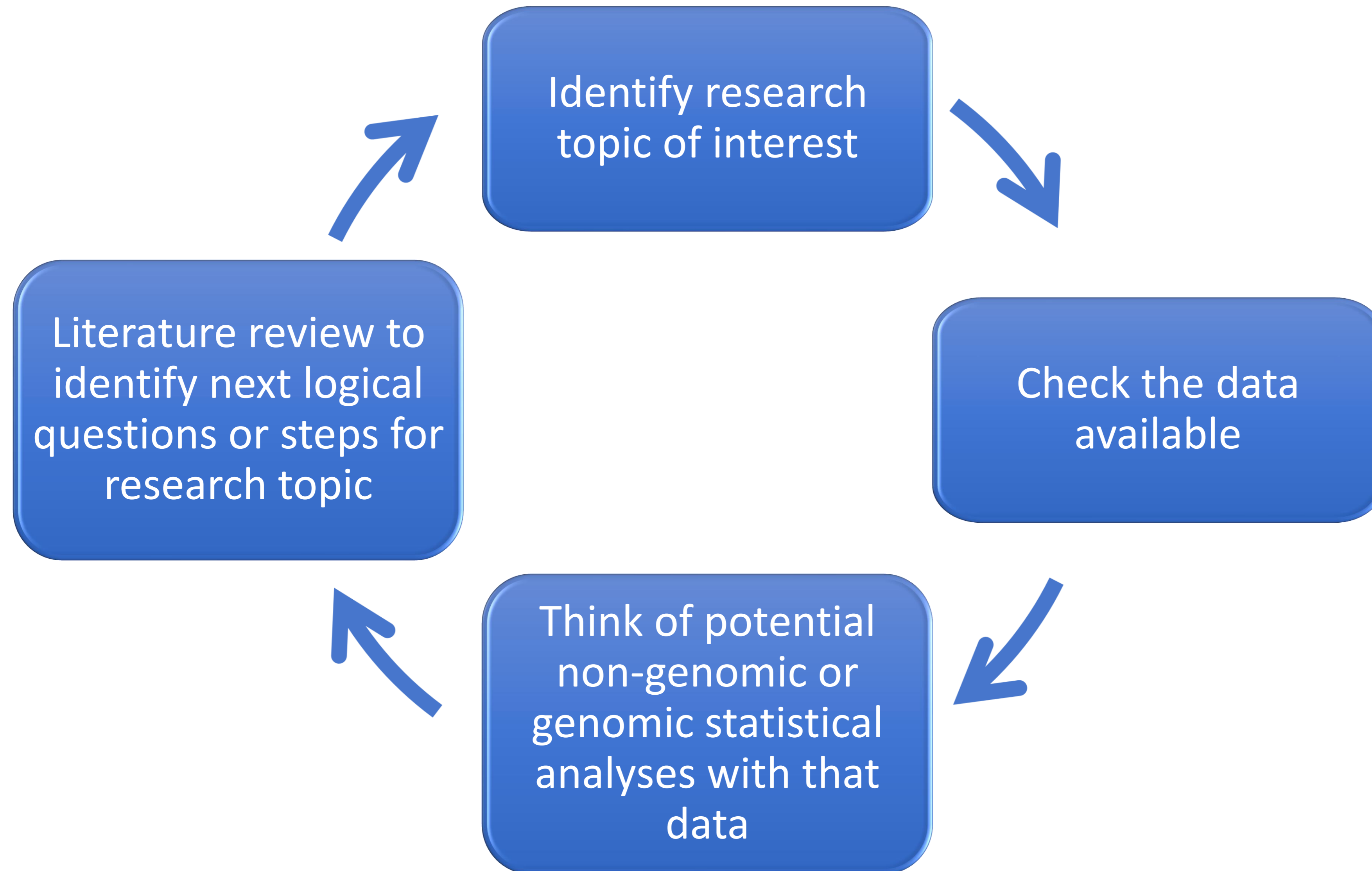
- Explore our calendar of dedicated office hours where researchers can talk about data types and tools with experts



<https://researchallofus.org/support>

Research with the *All of Us* data

To begin a research project with *All of Us* data, you can follow these steps below:

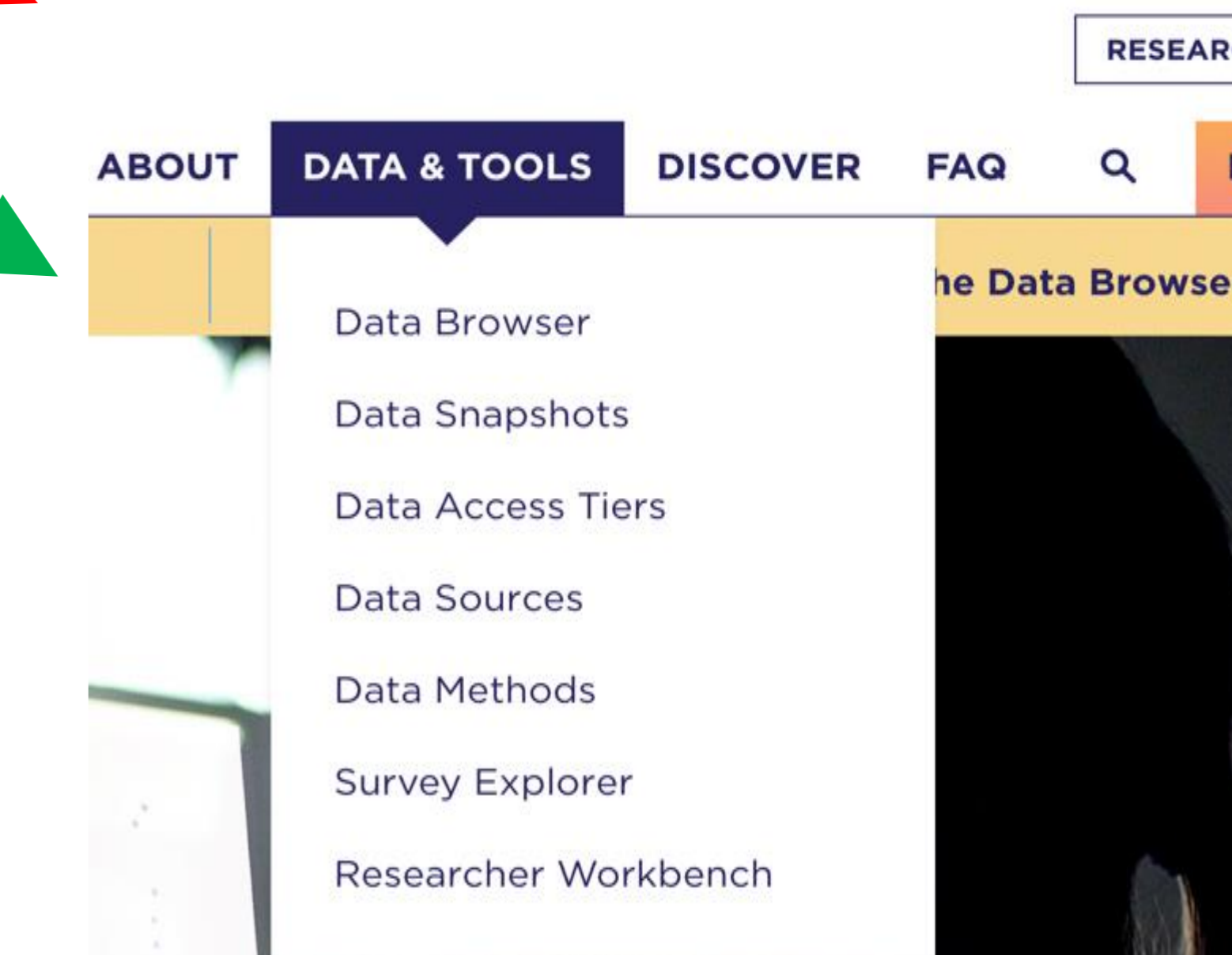
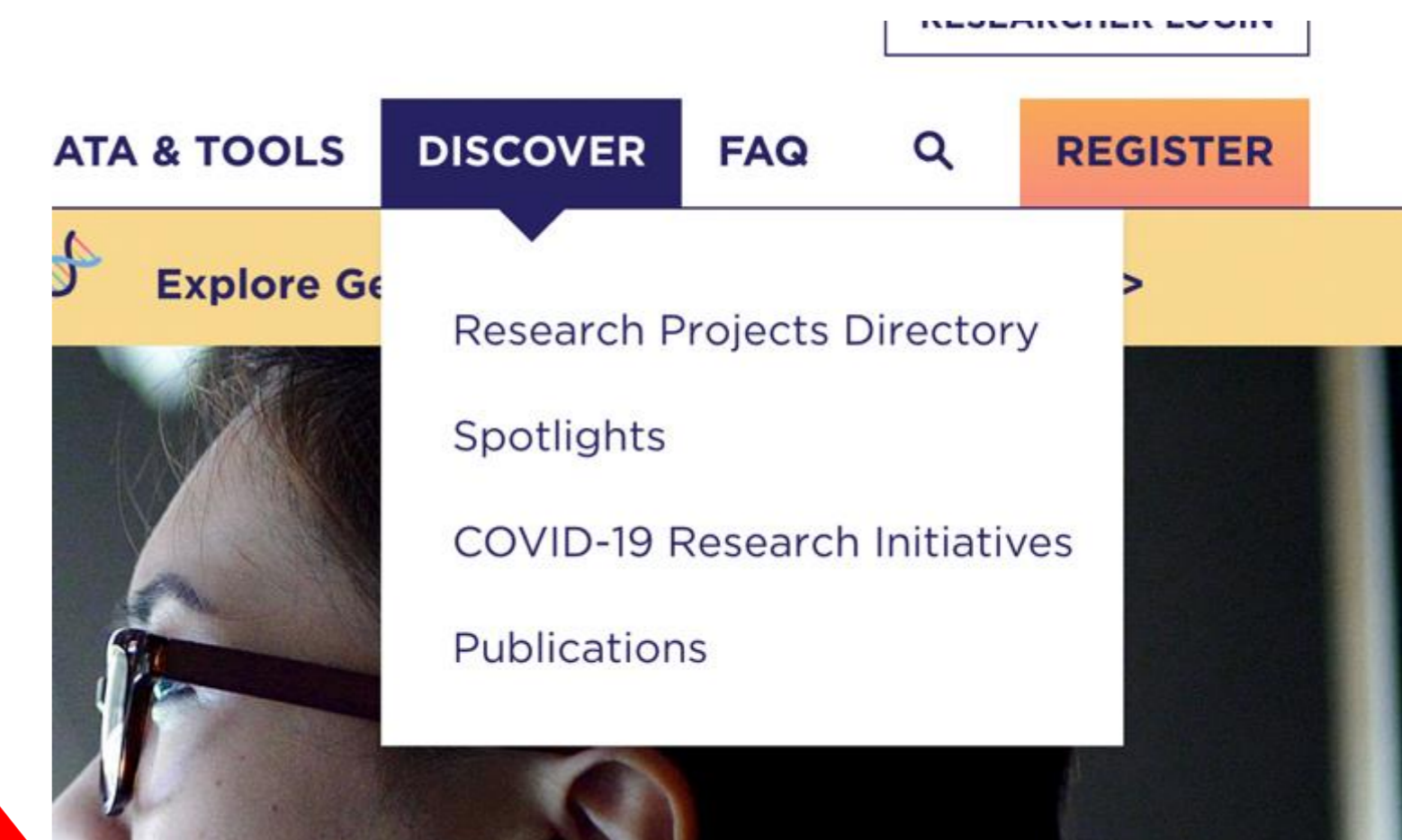
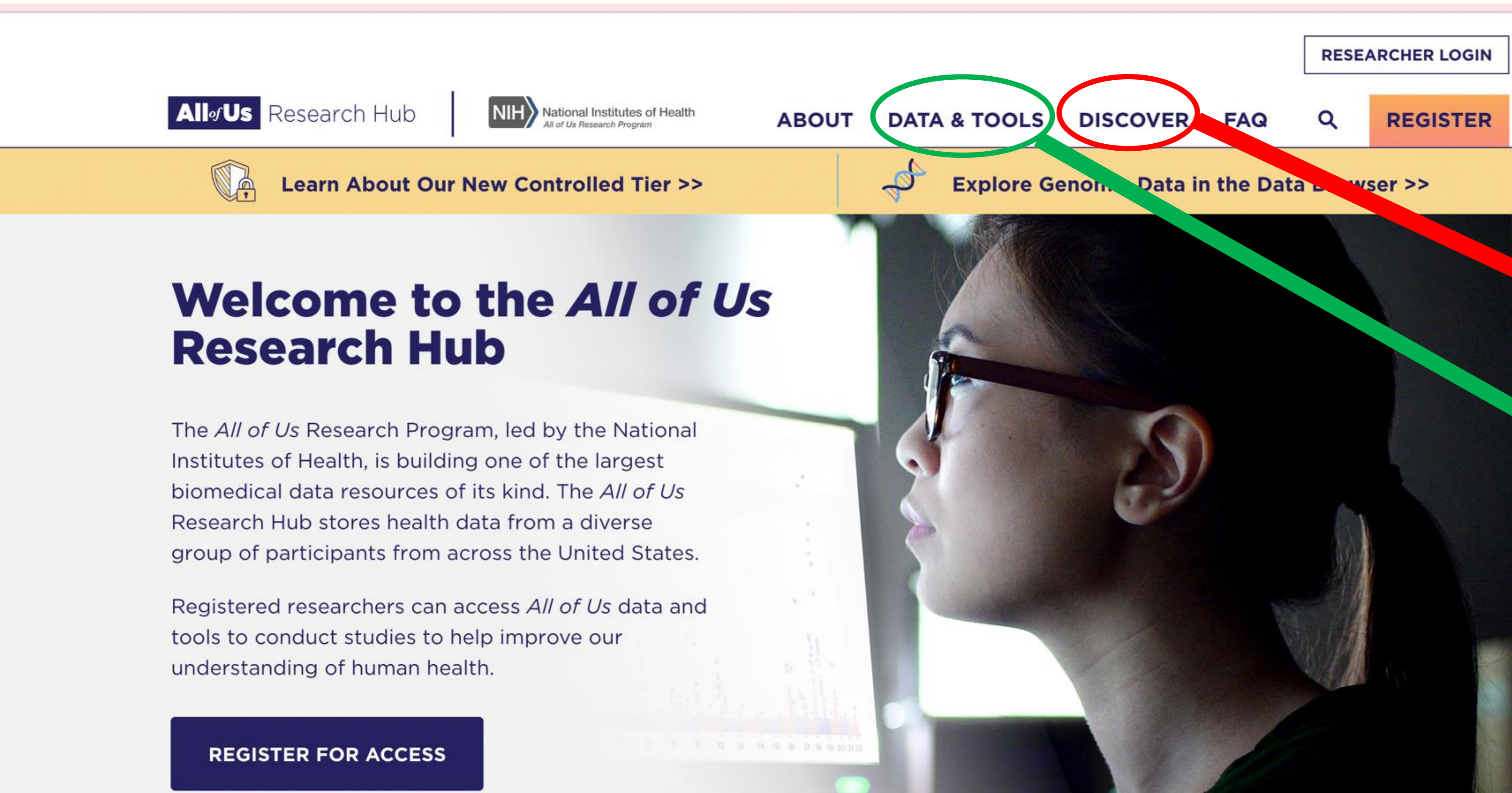


Step: Identify research topic of interest

Step: Check the data available

Use the Research Hub to explore potential research topics of interest and data available

<http://researchallofus.org>



Step: Think of potential non-genomic or genomic statistical analyses with the data

- Non-genomic statistical analyses used in publications with *All of Us* data so far:

Common

- Prevalence and confidence intervals
- T-test
- Chi-square test
- Logistic regression or PheWAS

Less common

- Z-score
- Wilcoxon rank-sum test
- ANOVA
- Kruskal-Wallis test
- Linear regression
- Pearson correlation
- Machine Learning

```
# Step 1: Enter the data.

#enter exam scores for each group
group1 = [85, 86, 88, 75, 78, 94, 98, 79, 71, 80] group2
= [91, 92, 93, 85, 87, 84, 82, 88, 95, 96] group3 = [79,
78, 88, 94, 92, 85, 83, 85, 82, 81]

#Step 2: Perform the one-way ANOVA.

from scipy.stats import f_oneway

#perform one-way ANOVA
f_oneway(group1, group2, group3)

## F_onewayResult(statistic=2.3575322551335636, pvalue=0.11384795345837218)
```

Step: Literature review to identify next logical questions or steps for your research topic based on data and prior analyses done

- ⦿ Use institutional access to publications
- ⦿ Google Scholar
- ⦿ Explore citations in publications

**Step 5:
Repeat steps as needed**

The screenshot displays the website for The Texas Medical Center Library. At the top left, it shows "Today's Hours: 7:00 AM- 10:00 PM" with a link to "More Hours". The main navigation bar includes "Historical" (Rare Books and Archives), "Find" (Books and Collections), "Services" (Consultations and Tools), "About" (Visiting and Contacts), and "Help" (Ask a Librarian and Guides). The "Find" menu is expanded, listing "Search Resources" such as Search Tool, Tutorials, DigitalCommons @TMC, A-Z Database List, Interlibrary Loan Service, Suggest a New Resource, and Research Guides. The footer contains the library's address, contact information, and social media icons for Facebook, Twitter, Instagram, and YouTube.

Studies taken from the *All of Us* Research Directory

Institution	Title of Research	Research Topic
University of Nebraska Medical Center	Health Literacy	(1)To determine how health literacy among Latinos in the United States differ by personal factors (i.e., age, nativity, education, primary language), geographic, and social factors). (2)To evaluate the effects of health literacy with self-rated health, quality of life, and healthcare experiences among Latinos. https://www.researchallofus.org/research-projects-directory/?searchBy=workspaceNameLike&directorySearch=health+literacy
University of California, Berkeley	Fitbit Data Analysis	To study and analyze Fitbit data in order to gain more insight about health. https://www.researchallofus.org/research-projects-directory/?searchBy=workspaceNameLike&directorySearch=data+analysis
SUNY Downstate Health Sciences University	Understanding Racial Battle Fatigue	To understand if there is an association with periodic discrimination and health inequities, within historically underrepresented racial/ethnic groups. https://www.researchallofus.org/research-projects-directory/?searchBy=workspaceNameLike&directorySearch=fatigue
University of California, Irvine	Cancer in U.S. born vs Foreign Born Hispanic Participants v5	To study the effects of birthplace and acculturation on the prevalence and risk of infection related cancers within the Hispanic population. https://www.researchallofus.org/research-projects-directory/?searchBy=workspaceNameLike&directorySearch=cancer
University of California, San Diego	Health Disparities Experienced by Adults with ASD (Autism Spectrum Disorder)	To assess how patients diagnosed with Autism Spectrum Disorder are treated differently in healthcare settings with respect to medications, imaging, or invasive procedures. https://www.researchallofus.org/research-projects-directory/?searchBy=workspaceNameLike&directorySearch=health
University of Minnesota	Resilience and COVID-19	To examine psychosocial aspects (i.e. social isolation, resilience, and loneliness) during the COVID-19 pandemic using the All of Us de-identified research data. https://www.researchallofus.org/research-projects-directory/?searchBy=workspaceNameLike&directorySearch=covid&perPage=25&directoryPage=2
The Broad Institute	Postmenopausal Women in AoU	To understand how age at menopause influences an array of age-related conditions and outcomes across women of different race/ethnicity. https://www.researchallofus.org/research-projects-directory/?searchBy=workspaceNameLike&directorySearch=women
University of Puerto Rico Medical Sciences	Public Health (Alzheimer in Puerto Ricans)	To determine if Puerto Ricans on the island suffer more from Alzheimer than Puerto Ricans on the U.S. mainland.

<https://www.researchallofus.org/research-projects-directory/>

Studies taken from the *All of Us* Research Directory

Institution	Title of Research	Research Topic
University of Miami	Retention of Participants Underrepresented in Biomedical Research	To determine there are additional social and behavioral factors that affect retention of participants in the All of Us Research Program. https://www.researchallofus.org/research-projects-directory/?searchBy=workspaceNameLike&directorySearch=biomedical
University of Alabama at Birmingham	Malnutrition	To assess feasibility of identifying genetic variants with malnutrition using available biomarker levels. https://www.researchallofus.org/research-projects-directory/?searchBy=workspaceNameLike&directorySearch=nutrition
University of California, San Diego	Depression Fitbit Study	Access the Fitbit data to distinguish individuals based on diagnostic severity and additional modifiers using daily activity data and sleep data. https://www.researchallofus.org/research-projects-directory/?searchBy=workspaceNameLike&directorySearch=FITBIT
Northwestern University	Behavioral Patterns and Men's Health	To explore the behavioral patterns of men struggling with health issues such as infertility, low testosterone, and erectile dysfunction. https://www.researchallofus.org/research-projects-directory/?searchBy=workspaceNameLike&directorySearch=behavioral
University of Puerto Rico Medical Sciences	Public Health (Alzheimer in Puerto Ricans)	To determine if Puerto Ricans on the island suffer more from Alzheimer, than Puerto Ricans on the U.S. mainland. https://www.researchallofus.org/research-projects-directory/?searchBy=workspaceNameLike&directorySearch=public+health
Rutgers, The State University of New Jersey	LGBTQ Housing and Mental Health	(1)To examine housing differences by sexual orientation and gender identity. (2)To assess the relationship between mental health, substance use outcomes, and housing instability among LGBTQ people. https://www.researchallofus.org/research-projects-directory/?searchBy=workspaceNameLike&directorySearch=mental+health+
Yale University	Determinants of Cardiovascular Disease Across Minority Populations v4	(1)To identify if specific minority groups with high risk of developing cardiovascular disease may benefit from tailored diagnostic and therapeutic interventions. (2)To identify new treatments for these conditions. https://www.researchallofus.org/research-projects-directory/?searchBy=workspaceNameLike&directorySearch=cardiovascular

<https://www.researchallofus.org/research-projects-directory/>

A decorative graphic featuring several colorful stars (orange, yellow, red, green) and circles (blue, green, orange) scattered around the text. The text "DATA QUEST" is written in a dark blue, serif font. The word "DATA" is on the top line and "QUEST" is on the bottom line. The letters are slightly overlapping and have a subtle shadow effect.

DATA QUEST

Virtual Event
TUESDAY, FEB. 27
7:00-8:00 PM CST



Register today!
Scan the QR code or visit bit.ly/498WIBO



Please scan QR code and provide feedback regarding this session.

*Answering Clinical Questions with the AoU
Dataset*

Research Question

- Topic:

- What are between genomic variants and social determinants of health risk factors associated with stillbirth?

- What is known:

- Intrauterine fetal demise (IUFD) or stillbirth, is defined in the United States (US) as fetal death at ≥ 20 weeks' gestation and complicates about 1 in 175 pregnancies annually. It is one of the most common adverse pregnancy outcomes with profound psychological, social, and cultural impacts on women and their families. Numerous medical and obstetrical risk factors have been identified as contributing to stillbirth.
- Although SDOH have been linked to IUFD occurrence, more research is needed to understand how these factors are connected to the underlying genetic etiology of stillbirth.

- Research gap:

- Larger studies in diverse populations are needed

- Primary Objective:

- To identify genomic variants in women in with stillbirth.

- Secondary Objective:

- To identify social determinants of health (SDoH) risk factors associated with stillbirth.

Using AoU Workbench to enhance current research

Survey Explorer

Participants in the *All of Us* Research Program respond to surveys spanning a variety of topics. The program has tested each survey for readability and accessibility using cognitive interviews and quantitative testing. This testing process included people from different educational backgrounds and geographic locations to capture a sample that reflects the U.S. population. After participants complete the core surveys (The Basics, Lifestyle, and Overall Health), they may complete additional surveys on other topics.

In addition to the source material below, more detailed information is available in the [Survey Data Codebooks](#).

Health Care Access & Utilization

This survey asks questions about a participant's access to and use of health care.

[VIEW ENGLISH VERSION](#)

[VIEW SPANISH VERSION](#)

Social Determinants of Health

This survey asks about the social determinants of health, including a participant's neighborhood, social life, stress, and feelings about everyday life.

[VIEW ENGLISH VERSION](#)

[VIEW SPANISH VERSION](#)

COVID-19 Participant Experience (COPE) Survey

This survey asks about the impact of COVID-19 on a participant's mental health, well-being, and everyday life. This survey was administered to participants multiple times from May 2020 to March 2021.

[VIEW ENGLISH VERSION](#)

[VIEW SPANISH VERSION](#)

Minute Survey on COVID-19 Vaccines

This survey collects information regarding a participant's COVID-19 vaccination experience. This survey was administered to participants multiple times from June 2021 to March 2022.

[VIEW ENGLISH VERSION](#)

[VIEW SPANISH VERSION](#)

Health Care Access and Utilization

Please complete the survey below.

Thank you!

DURING THE PAST 12 MONTHS, were you told by a health care provider or doctor's office that they did not accept your health care coverage?

- Yes
- No
- Don't know

In regard to your health insurance or health care coverage, how does it compare to a year ago? Is it better, worse, or about the same?

- Better
- Worse
- About the same
- Don't know

Is there a place that you USUALLY go to when you are sick or need advice about your health?

- Yes
- There is NO place
- There is MORE THAN ONE place
- Don't know

What kind of place do you go to most often?

- Doctor's office, clinic or health center
- Urgent care or minute clinic
- Hospital emergency room
- Some other place
- Don't go to one place most often
- Don't know

Prior to your current pregnancy about how long has it been since you last saw or talked to a doctor or other health care provider about your own health?

- Never
- 6 months or less
- More than 6 mos, but not more than 1 yr ago
- More than 1 yr, but not more than 2 yrs ago
- More than 2 yrs, but not more than 5 yrs ago
- More than 5 years ago
- Don't know

There are many reasons people delay getting medical care. Have you delayed getting care for any of the following reasons in the PAST 12 MONTHS?

Using the AoU to Validate Predictive Models

- 438 stillbirths from 2016-2022
- We found significant associations between social determinants of health and the risk of stillbirth
- We then created a model of the most significant variables in order to predict the occurrence of stillbirth.
 - Severe maternal morbidity score
 - Allostatic Load score
 - Genomic variants
- Limitations: Small sample size, One institution/location, limited maternal genetic data
- Currently working on using AoU database for validation of predictive model



All of Us Database **A tool for medical research**

Association of atopic dermatitis with substance use disorders: A case-control study in the All of Us research program.

Joshi TP, Bancroft A, DeLeon D, Garcia D, Kunisetty B, Truong P, Kim SJ. *J Am Acad Dermatol.* 2023 Nov;89(5):e237-e238. doi: 10.1016/j.jaad.2023.06.051. Epub 2023 Jul 14. PMID: 37454697 No abstract available.

Association of atopic dermatitis with Graves' disease and Hashimoto's thyroiditis: A case-control study in the All of Us research program.

Joshi TP, Bancroft A, Garcia D, Kahla JA, McBee DB, Duvic M. *J Am Acad Dermatol.* 2023 Oct;89(4):e175-e176. doi: 10.1016/j.jaad.2023.04.073. Epub 2023 Jun 12. PMID: 37315799 No abstract available.

Epidemiology of alopecia areata in the Hispanic/Latinx community: A cross-sectional analysis of the All of Us database.

Joshi TP, Garcia D, Gedeon F, Hinson D, Stroupauer E, Okundia F, Tschen J. *J Am Acad Dermatol.* 2023 Jul;89(1):e61-e62. doi: 10.1016/j.jaad.2023.02.054. Epub 2023 Mar 13. PMID: 36921806 No abstract available.

Association of alopecia areata with alcohol use disorder, attention-deficit hyperactivity disorder and insomnia: a case-control analysis using the All of Us research programme.

Joshi TP, Zhu H, Tomaras M, Terrell M, Stroupauer E, Stafford H, Okundia F, Iacobucci A, Holla S, Hinson D, Hanania H, Gonzalez C, Gedeon F, Garcia D, Friske S, Fernandez B, Stolar A, Ren V. *Clin Exp Dermatol.* 2023 Jul 7;48(7):797-799. doi: 10.1093/ced/llad084. PMID: 36883588 No abstract available.

Atopic comorbidities associated with granuloma annulare: A case-control study of the All of Us database.

Joshi TP, Chen V, Dong JL, Golden K, Iacobucci A, Lim Y, Morrow B, Duvic M. *J Am Acad Dermatol.* 2023 Jul;89(1):145-146. doi: 10.1016/j.jaad.2023.02.012. Epub 2023 Feb 18. PMID: 36804573 No abstract available.

Burden of atopic disease in Black and Hispanic patients with alopecia areata: a case-control study in the All of Us research program.

Joshi TP, Fernandez B, Friske S, Garcia D, Gedeon F, Gonzalez C, Hanania H, Hinson D, Holla S, Iacobucci A, Okundia F, Stafford H, Stroupauer E, Terrell M, Tomaras M, Zhu H, Duvic M. *Int J Dermatol.* 2023 Jul;62(7):e393-e394. doi: 10.1111/ijd.16528. Epub 2022 Nov 28. PMID: 36441011 No abstract available.

Comorbidities associated with lichen planopilaris: a case-control study using the All of Us database.

Joshi TP, Duruewuru A, Holla S, Naqvi Z, Zhu H, Ren V. *Int J Dermatol.* 2023 Jul;62(7):e396-e398. doi: 10.1111/ijd.16433. Epub 2022 Oct 2. PMID: 36183250 No abstract available.

Comorbidities associated with mycosis fungoides: A case-control study in the All of Us database.

Joshi TP, Black TA, Fernandez B, Friske S, Stafford H, Stroupauer E, Duvic M. *J Am Acad Dermatol.* 2023 Mar;88(3):686-688. doi: 10.1016/j.jaad.2022.07.003. Epub 2022 Jul 8. PMID: 35817334 No abstract available.

Prevalence of lichen planopilaris in the United States: A cross-sectional study of the All of Us research program.

Joshi TP, Zhu H, Naqvi Z, Holla S, Duruewuru A, Ren V. *JAAD Int.* 2022 Jun 13;8:69-70. doi: 10.1016/j.jdin.2022.05.003. eCollection 2022 Sep. PMID: 35721298 **Free PMC article.** No abstract available.

Psychiatric comorbidities associated with granuloma annulare: A case-control study in the All of Us database.

Joshi TP, Chen V, Dong JL, Golden K, Iacobucci A, Lim Y, Morrow B, Khalfe N, Duvic M. *J Am Acad Dermatol.* 2022 Sep;87(3):e119-e120. doi: 10.1016/j.jaad.2022.05.056. Epub 2022 Jun 3. PMID: 35662661 No abstract available.

Prevalence of pityriasis rosea in the United States: A cross-sectional study using the All of Us database.

Joshi TP, Calderara GA, Lipoff JB. *JAAD Int.* 2022 May 19;8:45-46. doi: 10.1016/j.jdin.2022.04.006. eCollection 2022 Sep. PMID: 35620324 **Free PMC article.** No abstract available.

Tejas's Experience with *All of Us*

Previous *All of Us* Projects

- ❖ Exploring prevalence of dermatoses (e.g., pityriasis rosea)
- ❖ Exploring medical co-morbidities of dermatologic diseases (e.g., keratinocyte skin cancer in patients with hereditary hemochromatosis)

Tejas's Experience with *All of Us*: How to come with your own research question?

Be passionate and curious!

Read, read, read!

- ❖ **Good starting place is journals of your target specialty (e.g., JAAD/JAMA Dermatology for dermatology)**
- ❖ **What are some gaps in the literature?**
- ❖ **Can you do a project to address/explore these gaps?**

Tejas's Experience with *All of Us*: Specific Examples

> J Am Acad Dermatol. 2022 Jul;87(1):197-199. doi: 10.1016/j.jaad.2021.07.033. Epub 2021 Jul 29.

FULL TEXT LINKS



Comorbidities associated with granuloma annulare: A case-control study in the All of Us research program

ACTIONS

Audrey C Leasure ¹, William Damsky ², Jeffrey M Cohen ³

Affiliations + expand

PMID: 34333076 PMCID: [PMC8799765](#) DOI: [10.1016/j.jaad](#)

[Free PMC article](#)

Table 2.

Univariable and Multivariable Association of Comorbidities with GA

Covariate	Univariable OR (95% CI)	p	Multivariable OR (95%CI)	p
Age	1.00 (0.99-1.01)	1.00	0.98 (0.97-1.00)	0.01
Female sex	1.00 (0.66-1.49)	1.00	1.03 (0.66-1.58)	0.91
Ever smoker	1.60 (1.14-2.23)	0.006	1.54 (1.09-2.18)	0.02
Hyperlipidemia	1.62 (1.16-2.28)	0.005	1.63 (1.07-2.49)	0.02
Hypothyroidism	2.02 (1.38-2.93)	<0.001	1.86 (1.23-2.80)	0.003
Type II DM	1.59 (1.06-2.35)	0.02	1.30 (0.84-2.02)	0.27
Autoimmune Disease *	1.74 (1.07-2.77)	0.02	1.47 (0.88-2.42)	0.13

[Open in a separate window](#)

*Autoimmune disease includes systemic lupus erythematosus, rheumatoid arthritis, inflammatory bowel disease, thyroiditis, vitiligo, and alopecia areata.

Abbreviations: GA = granuloma annulare; OR = odds ratio; CI = confidence interval; DM = diabetes mellitus

Leasure et al., *J Am Acad Dermatol*, 2022

Tejas's Experience with *All of Us*: Specific Examples

Table II. Psychiatric comorbidities of patients with granuloma annulare after adjusting for thyroid disease as a possible confounder using the Cochran-Mantel-Haenszel test

Comorbidity	OR (95% CI)	<i>P</i> value
Depression	1.24 (0.91-1.70)	.21
Insomnia	1.91 (1.33-2.75)	.001
Opioid dependence	2.11 (1.14-3.90)	.02
PTSD	1.60 (0.81-3.18)	.21

OR, Odds ratio; PTSD, posttraumatic stress disorder.

Table II. Atopic comorbidities associated with granuloma annulare in univariable and multivariable analyses

Atopic comorbidity	Univariable OR (95% CI)	<i>P</i> value	Multivariable OR (95% CI)*	<i>P</i> value
Allergic rhinitis	6.22 (4.56-8.47)	<.001	5.68 (4.16-7.76)	<.001
Asthma	3.72 (2.69-5.14)	<.001	3.05 (1.95-4.77)	<.001
Eczema	6.39 (4.11-9.93)	<.001	5.75 (3.67-9.00)	<.001

OR, Odds ratio.

*OR adjusted for age, educational attainment, income, insurance type, number of primary care physician visits within the past 12 months, race, sex, and smoking.

Tejas's Experience with *All of Us*: Other Tips

Find a mentor.

- ❖ Sometimes find more than one mentor!

Learn how to build multivariable logistic regression models to control for confounders.

- ❖ E.g., does thyroid disease affect prevalence of psychiatric co-morbidities?

- ❖ Reviewers will ask for this!

Try not to study rare diseases that have fewer than 100 patients in the database.

- ❖ *All of Us* data dissemination guidelines prohibit publication of individual counts <20!

Current *All of Us* Projects



Vikram Rakesh Shaw
MS4 MD/PhD

- Investigating the epidemiologic association between lung cancer and other medical conditions or risk factors
- Investigating the epidemiologic association and genetic correlation between inflammatory bowel disease (IBD) and other medical conditions or clinical variables
- Building a polygenic risk score (PRS) using genomic array data within the *All of Us* database for inflammatory bowel disease, along with other traits of interest
- [Obstructive sleep apnea among patients with psoriasis: A case-control study in the All of Us Research Program.](#) Shaw VR, Tobias LA, Cohen JM. *J Am Acad Dermatol.* 2023 Nov 25; PMID: 38008412
- [A comprehensive analysis of lung cancer highlighting epidemiological factors and psychiatric comorbidities from the All of Us Research Program.](#) Shaw VR, Byun J, Pettit RW, Han Y, Hsiou DA, Nordstrom LA, Amos CI. *Sci Rep.* 2023 Jul 5;13(1):10852. PMID: 37407606

How to get started as a medical student

- Browse *All of Us* publications in PubMed to learn about the different types of studies that can be conducted with the database
- Learn basic “R” data manipulation commands and jargon through YouTube instruction or ChatGPT
- Come up with a research question
- Pass the *All of Us* Research Program training and familiarize yourself with the Researcher Workbench
- Get started analyzing your first research question!

BCM Mentors

April Adams MD, PhD Placental development and function, Pregnancy loss, Health disparities

Monica Alzate, PhD mental health services, integrated health care, and behavioral health consulting.

Jinyoung Byun PhD Biostatistician in Biomedical Data Science interested in cancer research

Carolina J. Jorgez, Ph.D. Male infertility and the causes of congenital and pediatric urologic diseases from common defects such as cryptorchidism and hypospadias to rare ones such as bladder exstrophy.

Benny Abraham Kaiparettu PhD Mechanism of mitochondrial energy reprogramming and mitochondria-nuclear crosstalk in cancer progression and metastasis of aggressive tumors.

Diana Monsivais, Ph.D Signaling pathways that underpin endometrial regeneration and are abnormal in women with infertility, endometriosis and endometrial cancer.

Antone Opekun, M.S.. Medicine-Gastroenterology

Edgardo Ordonez, M.D health disparities across the intersection of race, ethnicity, language preference, health literacy, and social determinants of health. Interested in both acute and chronic disease management in multiple settings emergency medicine and internal medicine,.

Ross Poche, PhD Eye disease and melanoma

Thomas Taylor MD Data scientist with experience in VA research, military health. Modeling of cirrhosis clinical outcomes, pediatrics health outcomes (e.g., cardiology), mental health, behavioral health, and substance dependence related health outcomes. He is interested in neural network architectures (transformers) for diverse feature modeling, risk modeling and the decision sciences using machine learning, and observational causal inference methodologies. He primarily uses R and Python

Alexis Wood, PhD how gene-environment interplay changes an individual's response to the environment, with a focus on behavior.

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



www.bcm.edu/allfuseveningswithgenetics

www.researchallofus.org/EWG

www.researchallofus.org/EWGtraining

@BCM_AoUEvnwGene

BCM All of US Evenings with Genetics Research Program

All of Us Journey at Baylor College of Medicine

Mobile Tour



Tuesday, April 30th
10:00 am - 4:00 pm

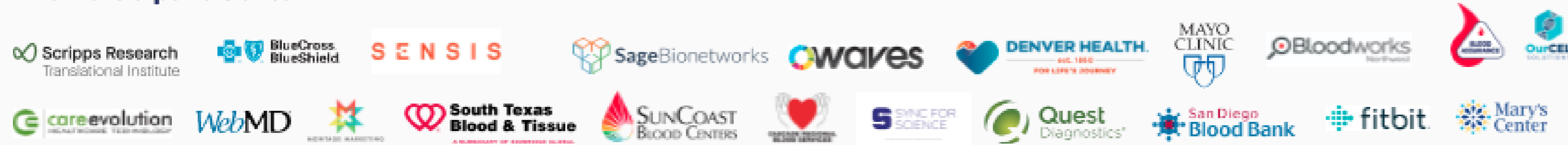
Wednesday, May 1st
9:30 am - 2:00 pm

Thursday, May 2nd
9:30 am - 2:00 pm

Friday, May 3rd
10:00 am - 4:00 pm

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

UC San Diego Health

UCI Health

UC DAVIS HEALTH

UCSF

Cedars Sinai

Keck School of Medicine of USC

Illinois Precision Medicine Consortium

Northwestern Medicine

THE UNIVERSITY OF CHICAGO

NorthShore

RUSH

THE UNIVERSITY OF ILLINOIS COLLEGE OF MEDICINE

UI Health

COOK COUNTY HEALTH

All of Us New England

Mass General Brigham

BOSTON MEDICAL CENTER

Trans America Consortium

Henry Ford HEALTH SYSTEM

Essentia Health

BaylorScott & White HEALTH

RELIANT MEDICAL GROUP

HealthPartners Institute

New York City Consortium

COLUMBIA

Well Cornell Medicine

NYC HEALTH+HOSPITALS | Harlem

NewYork-Presbyterian

All of Us Southern Network

US MEDICINE

US HEERSINK

Cooper Green Mercy

THE UNIVERSITY OF MISSISSIPPI MEDICAL CENTER

Tulane University

USA HEALTH

University of Alabama at Birmingham

TUSKEGEE UNIVERSITY

LSU Health NEW ORLEANS

All of Us Southeast Enrollment Center

UHealth

EMORY UNIVERSITY

MOREHOUSE SCHOOL OF MEDICINE

UF UNIVERSITY OF FLORIDA

THE UNIVERSITY OF NORTH CAROLINA AT CHAPEL HILL

All of Us Wisconsin

Marshfield Clinic Health System

Froedtert & Medical College of Wisconsin

WISCONSIN

GUNDERSEN HEALTH SYSTEM

All of Us Pennsylvania

University of Pittsburgh

University of Arizona and Banner Health

THE UNIVERSITY OF ARIZONA

Banner Health

MARIPOSA

FQHCs (Federally Qualified Health Centers)

Cherokee

SAN YSIDRO HEALTH

Sun River Health

WINDLE GIST COMPREHENSIVE HEALTH CENTER

Community Health Center, Inc.

VA Medical Centers

VA U.S. Department of Veterans Affairs Veterans Health Administration

Nutrition for Precision Health (NPH)

BUNC

All of Us Puerto Rico

cosma

CENTRO COMPRENSIVO DE CANCER

Participant Technology Systems Center (PTSC)

vibrent

Biobank

MAYO CLINIC

Data & Research Center (DRC)

COLUMBIA

VANDERBILT UNIVERSITY MEDICAL CENTER

BROAD INSTITUTE

verily

SCHOOL OF PUBLIC HEALTH UNIVERSITY OF MICHIGAN

Northwestern Medicine

UTHealth The University of Texas Health Science Center at Houston

Genomics Partners

BROAD INSTITUTE

Baylor College of Medicine

JOHNS HOPKINS

UTHealth The University of Texas Health Science Center at Houston

HUDSONALPHA

color

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