

BDC Data Overview March 2024



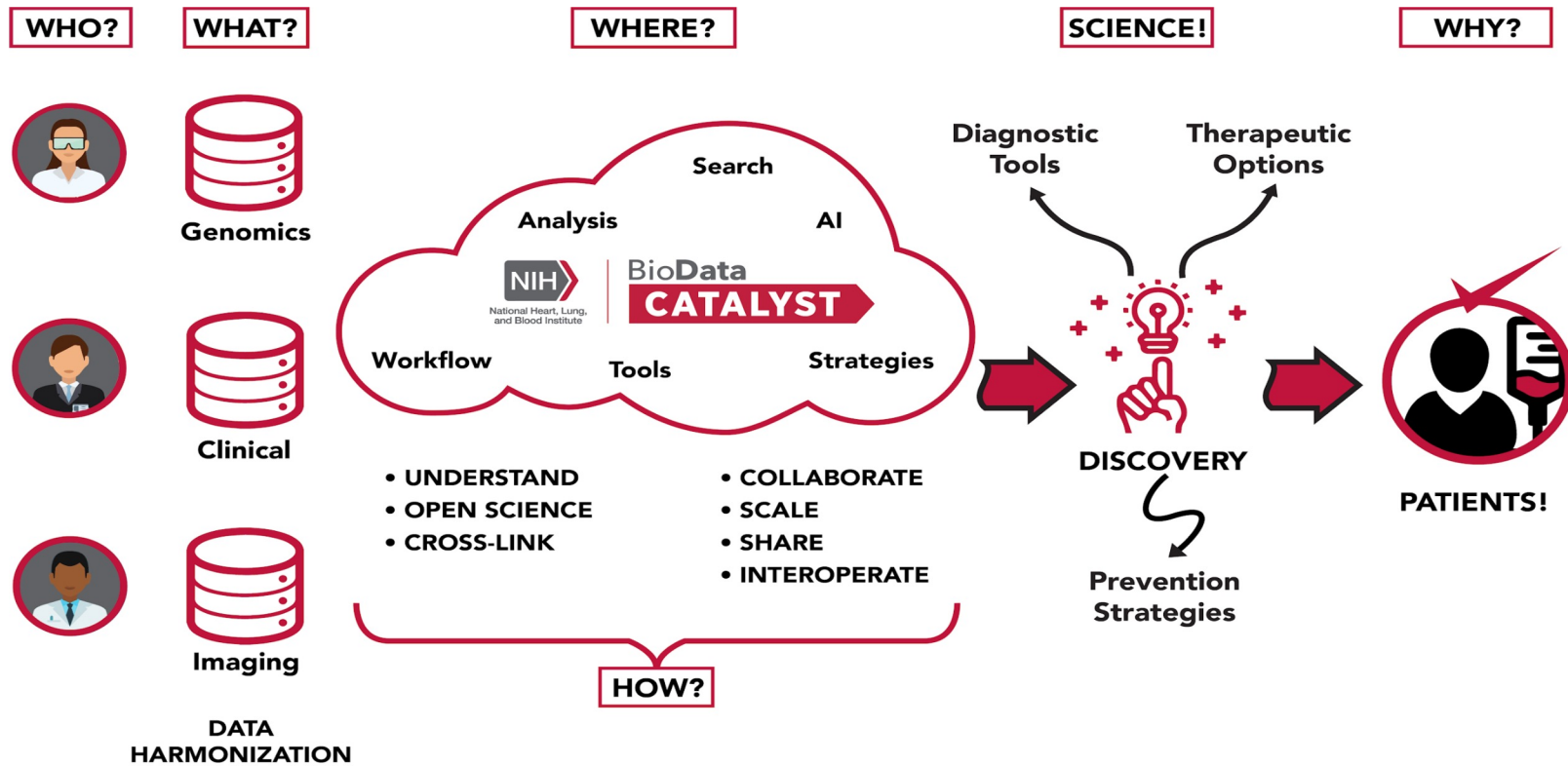
Sweta Ladwa, MPH

NHLBI BDC Data Management Core
Scientific Program Director

Prior to joining the NHLBI team, Mrs. Ladwa served as a consultant to various agencies within the Department of Health and Human Services (HHS) including the Centers for Medicare and Medicaid Services (CMS), The National Cancer Institute (NIH/NCI), and the Office of the National Coordinator for Health IT (ONC). She led numerous efforts relating to Health Information Technology, Epidemiology, and Big Data in areas such as data aggregation, coordination, and visualization for rare and common cancers, development of FHIR Implementation Specifications for PCOR and other use cases and curating de-novo and de-facto standards for biomedical research.

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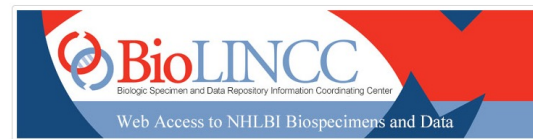
NHLBI's BDC Overview



NHLBI's BDC Overview: Analytic Capabilities

- Analytic workspaces (Jupyter, R, Python, SAS)
- GWAS (using GENESIS or HAIL)
- Variant Calling using GATK or TOPMed (WES/WGS Data)
- Image visualization and analysis including Machine Learning models
- App Development
- App Hosting
- Pipeline Development (CWL or WDL, Nexus coming soon)
- Bring Your Own Data (BYOD)
- Team Collaboration Workspaces
- Import and publish apps and workflows to/from dockerized apps (e.g. Dockstore)
- Search:
 - Search UI – Genotype and Phenotype
 - Search API
 - Synthetic Cohort Generation
 - Semantic meta-data search

NHLBI's BDC Overview: Data



A few NHLBI Data Generating Programs

Trans-Omics for Precision Medicine (TOPMed)

Multi-omics data from NHLBI longitudinal cohort studies: WGS, sc-RNA, metabolomics, proteomics, methylation, DNA, etc.

HeartShare/AMP (NHLBI)

Retrospective NHLBI cohort data + Prospective Data Collection

Retrospective: Multi-modal imaging (echos, ECGs, etc.), clinical, multi-omics, etc.

Prospective: Clinical, Omics, Imaging, EHR

National Sleep Research Resource (NSRR)

Multi-modal sleep data: clinical, polysomnography, actigraphy, etc.

Pediatric Cardiac Genomics Commons (PCGC)

Multi-modal data on pediatric populations: clinical, omics, EHR, imaging

CONNECTS

COVID-19 related observational studies and clinical trials data

Trans-NIH Data Generating Programs and BDC

RECOVER

- Longitudinal Epidemiological Study
- Multiple modalities: clinical, genomic, imaging (multiple modalities), clinical trials, sensor, mobile health, biospecimen, etc.

Regenerative Medicine Innovation Program (RMIP)

- Multi-modal cell characterization data
 - Single-Cell RNA, cyTOF, WGS/WGBS, etc.

Pause for questions and comments

BDC Hosted Data Released December 2023 to March 2024



BioData
CATALYST



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December 2023-March 2024

NSRR	<u>National Sleep Research Resource (NSRR) - CFS</u>
CONNECTS	<u>CONNECTS_C3PO_Assay</u>
CONNECTS	<u>CONNECTS_ACTIV4C_DataDictionaryFile</u>
CONNECTS	<u>CONNECTS_ACTIV4A</u>
TOPMed	<u>TOPMed_SPIROMICS</u>
TOPMed	<u>TOPMed_BostonBrazil_SCD</u>
PCGC	<u>PCGC_SRA</u>
LungMAP	<u>LungMAP</u>

Browse Data in BDC

<https://gen3.biodatacatalyst.nhlbi.nih.gov/discovery>

NIH

National Heart, Lung, and Blood Institute

BioData

CATALYST

Powered by Gen3

Discovery

Dictionary

Exploration

Profile

Browse Data

Documentation

Login

Summary Statistics

Tags

Table of Records

Pagination

176

481,719

Search studies by keyword...

Reset Selection

Study Filters

STUDIES

TOTAL SUBJECTS

0 selected

STUDY NAME	FULL NAME	NUMBER OF SUBJECTS	DBGAP ACCESSION NUMBER	RELEASED	DATA AVAILABILITY	
1000Genomes	Not available	3,202	open_access-1000Genomes	Yes		
high_coverage_2019_Public						

NIH


National Heart, Lung, and Blood Institute

BioData


CATALYST

Browse and Build Cohorts without Login

<https://openpicsure.biodatacatalyst.nih.gov/picsureui/>

 National Heart, Lung, and Blood Institute

BioData CATALYST
Powered by PIC-SURE®

 Open Access

Data Dashboard


Explorer

Help ▼


Log in to Authorized PIC-SURE

Search


NHLBI BioData Catalyst® Powered by PIC-SURE can be used to explore studies, conduct feasibility tests, create cohorts, and select data at the variable-value level.




Search Variables, Build Cohorts, and Retrieve Aggregate, Counts in **Explorer**



Browse Available Studies in **Data Dashboard**



Learn About the **BDC Ecosystem**



Log In to Access Participant-Level Data

79
Available Studies

347,297
Total Participants

151,744
Total Variables

Privacy Policy | Data Sharing Policy | Freedom of Information Act (FOIA) | Accessibility | U.S. Department of Health & Human Services | National Institutes of Health | National Heart, Lung, and Blood Institute | USA.gov | HHS Vulnerability Disclosure

Pause for questions and comments

Future Data-Related Updates in BDC



BioData
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Data-Related Updates

BDC Data Model in development

- A common, LinkML-based model to facilitate a consistent representation of data rooted in standards and ontologies to facilitate search and use case-based harmonization

FHIR Server in development

- Phase 1 focused on supporting metadata for discoverability and EHR data exchange
- Phase 2 focused on supporting SDOH data

Implementing DataCite DOIs

- Increases FAIR-ness of data and tools/workflows
- Benefits include ease of reference for publications

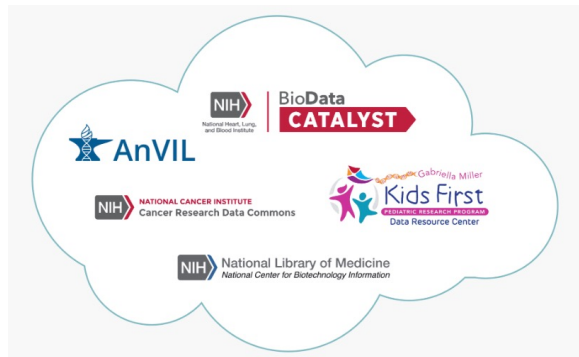
NIH Researcher Auth Service (RAS)

- Allows researchers' data access to follow the researcher to the NIH computational environment of their choice to facilitate interoperability

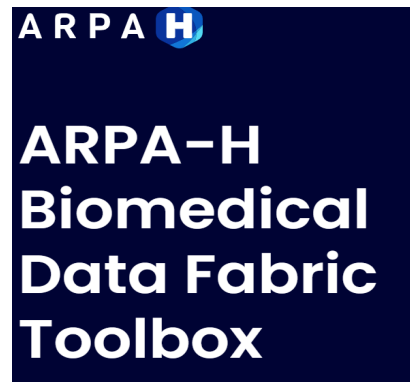
Supporting HLBS researchers

- Adding additional data and metadata to support HLBS researcher needs
- Supporting the NHLBI Supplement to the NIH Final Policy for Data Management and Sharing
- Continuous improvement based on feedback from BDC stakeholders

BDC and Interoperability



NIH Cloud Platform Interoperability (NCPI)
Federate data analysis (bring compute to data with NIH Partner Systems)



Advanced Research Projects Agency for Health (ARPA-H)
Biomedical Data Fabric Toolbox
Support a national, unified consistent layer of data services to work across many different systems and environments



GA4GH
DRIVER PROJECT

Global Alliance for Genomics and Health
Work to interoperate with international data sources, including UK Biobank and the NIH All of Us Research Program

Acknowledgements

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- BDC EEP
- BDC Coordinating Center: Dr. Ashok Krishnamurthy/Dr. Stan Ahalt
- RTI International: Mrs. Becky Boyles
- BDC Data Management Core: Mr. Chris Siege and Dr. Anne Thessen
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