



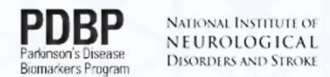
BRICS

Biomedical Research
Informatics Computing System

BRICS Demo Query Tool and APIs

Biomedical Research Informatics Computing System (BRICS)

April 11th, 2024





Audio/Video	Please keep your microphone muted
Recording	<ul style="list-style-type: none">• Today's session will be recorded• Will be posted on the BRICS website: https://brics.cit.nih.gov/demo
Questions & Comments	<ul style="list-style-type: none">• We encourage your participation today• Please use the chat for questions & comments. The chat will be monitored throughout today's demo.• There will also be time after each speaker and at the end of the demo to ask live questions.



Time	Topic	Speaker(s)
9:00 AM-9:10 AM	Introduction and Query Tool Overview	Dr. Matthew McAuliffe
9:10 AM-9:25 AM	Demo on NIA Use Case for Query Tool	Dr. Saba Al-Sayouri Data Scholar
9:25 AM-9:40 AM	Query Tool APIs and Visualization	Dr. Alexandra Bokinsky
9:40 AM-9:55 AM	BRICS APIs and Analysis	Dr. Maria Bagonis Data Scholar
9:55 AM-10:00 AM	Questions & Closing Remarks	Dr. Matthew McAuliffe





BRICS

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Informatics Computing System

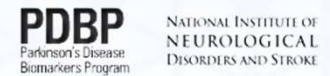
BRICS - Brief Introduction

Matthew J. McAuliffe, PhD (Biomedical Engineering)
Chief, Scientific Applications Services (SAS), CIT

[Home | BRICS \(nih.gov\)](http://brics.nih.gov)
<https://brics.cit.nih.gov>

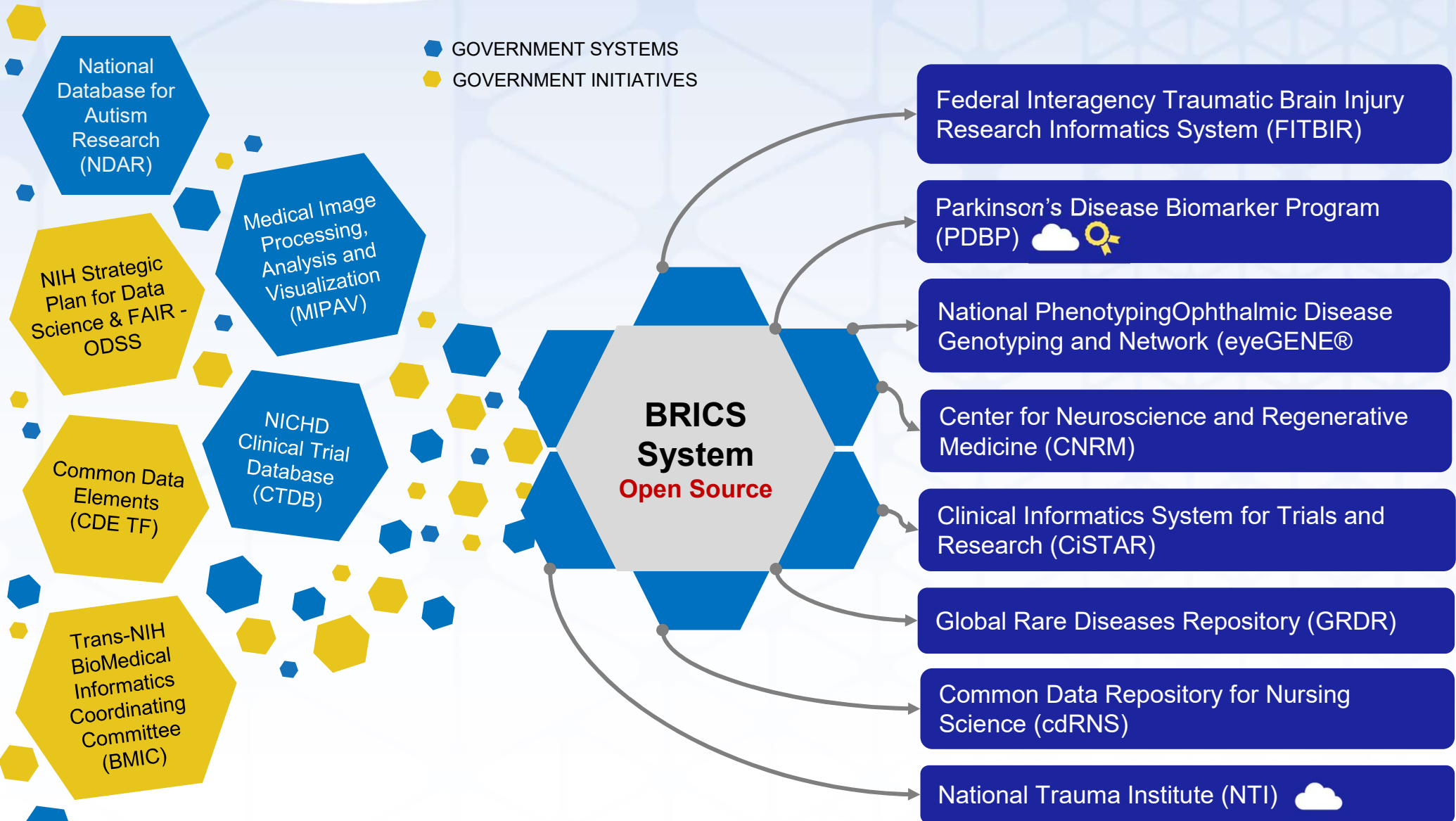


MTBI²





















Building from existing projects



🏆 14th Annual Excellence.gov Awards Overall winner



BRICS Mesh And Fabric

 FITBIR <small>Federal Interagency Traumatic Brain Injury Research INFORMATICS SYSTEM</small>	 PDBP	 cdRNS <small>Common Data Repository for Nursing Science</small>	 eyeGENE <small>National Eye Institute Research Coordinating Network</small>	 NIH <small>National Institute on Aging</small>	 NIH <small>National Institute of Neurological Disorders and Stroke</small>	 NIH <small>National Center for Advancing Translational Sciences</small>	
FITBIR	PDBP	cdRNS	eyeGENE	NIA	NINDS	GRDR	BRICS Intramural
Accounts	Accounts	Accounts	Accounts	Accounts	Accounts	Accounts	Accounts
ProFoRMS	ProFoRMS	ProFoRMS	ProFoRMS				ProFoRMS
Subject Mgmt.	Centralized Global Unique Identifier (GUID:PPRL)						Subject Mgmt.
Shared Data Dictionary		Data Dictionary	Data Dictionary				Data Dictionary
Data Repository	Data Repository	Data Repository	Data Repository				Data Repository
Query	Query	Query	Query				Query
Meta Study	Meta Study	Meta Study	Meta Study				Meta Study
							
On Premise	Cloud	On Premise	On Premise	On Premise	On Premise	On Premise	Cloud

Datatypes: Phenotypic, Imaging, and Omics



Spiderman Release: (June 2024)

- Real time saving of locked ProFoRMS data to the repository (Migrating to Mongo DB from PostGres)
- Submission Tool | Globus Integration
- UI Enhancements for the Accounts, Meta Study and Query Tool modules
- Tech library updates as needed
- Various UI and feature enhancements across the BRICS modules





BRICS Tools | Plug & Play Components for the Full Research Lifecycle

BRICS offers researchers a secure platform and a suite of web-based and downloadable tools that can be shared across disease categories or deployed and branded independently, depending on the needs of your program.



Data Mapping & Transformation

Tool that translates data into CDEs used by BRICS to prepare for validation



Data Dictionary

Intelligent clinical research data dictionary that supports cross-system exchange, CDEs



Data Repository

Functionality to define and manage studies and contribute or store data



ProFoRMS

Module for electronic data capture (EDC), subject management and scheduling, etc, (21 CFR part 11 compliant)



Meta Study

Workspace that aggregates data and metadata across studies for reference



Global Unique Identifier

Cross-study Privacy Preserving Record Linkage (PPRL) system

Continues...



Query

Tool enabling filtering of submitted data using data elements and form structures



Clinical Trials Management System (CTMS)

Management of Clinical Trials by enabling insight into trial performance.



BRICS Imaging Tools

Enables quantitative analysis and viewing of medical images, such as PET, MRI, CT, or microscopy.



Forum

Discussion board for account users for posting messages, interacting with each other, and discussing various topics



Account Management

Create, approve, and manage user accounts. (RAS enabled)



InET

Application for assigning new training, tracking current training, licenses and compliance.



STAMS: Specimen Tracking And Management System

Provides the path to container storage locations (e.g. freezer) that guides the user to the specific container and sample.



NIH National Institute on Aging Welcome Administrator, Preeti [Log Out](#)


Home Workspace ProFoRMS Subject Management Data Dictionary Data Repository Query Meta Study Account Management Forum

Menu


- Workspace
- Admin Dashboard
- Module Overview

Modules: Building Blocks for the Research Life Cycle


There are a variety of key software modules comprising this system. These modules support the vision of interconnectivity and collaboration among the research communities, as well as, provide a combination of web-based functionality and downloadable tools that support data definition, data contribution, and data access throughout the research life cycle.




ProFoRMS




Subject Management




Data Dictionary




Data Repository




Query



Meta Study



Account Management



Forum

Demo on Query Tool module



Welcome Administrator, Matthew | Log Out

 Home Workspace ProFORMS Subject Management Data Dictionary Data Repository **Query** Meta Study Account Management Forum

Step 1: Filter Data

Step 2: Refine Data

 Admin Only: Clear Cache **🛒 Data Cart: 1 forms in 17 studies** Clear Data Cart Save New Query

Data Cart 🛒

Select a form to refine your query

Glasgow Outcome Scale Extended (GOS-E) 🛒

Drag here to join forms

First Form

Second Form

Third Form

Fourth Form

Fifth Form

Query Logic Box

 Select Criteria Datable View Permissible Value

Glasgow Outcome Scale Extended (GOS-E) (12656 Rows of Data)

FORMS:	GOSE_STANDARD					
REPEATABLE GROUPS:	MAIN					
ROW NO.	STUDY ID	DATASET	GUID	ASSOCIATED GUID	SUBJECTIDNUM	AGEYRS
1	392	FITBIR-DATA0014496	TBIYY662YVC		06C1078	42
2	392	FITBIR-DATA0014496	TBIAT815JWE		06C1073	36
3	392	FITBIR-DATA0014496	TBIHP687JA8		06C1071	37
4	392	FITBIR-DATA0014496	TBIYZ282KH1	TBI_INVXC402VAA	06C1067	38
5	392	FITBIR-DATA0014496	TBIDU897NEN		06C1087	43
6	392	FITBIR-DATA0014496	TBIHG854XG9		06C1085	39
7	392	FITBIR-DATA0014496	TBIXL521DJW		06C1082	53
8	392	FITBIR-DATA0014496	TBINY280KGH		06C1080	41
9	392	FITBIR-DATA0014496	TBICB635ZEX		05C1215	42
10	392	FITBIR-DATA0014496	TBIHN386UZP		05C1214	56
11	392	FITBIR-DATA0014496	TBIJZ524AVJ		05C1213	50
12	392	FITBIR-DATA0014496	TBICE408HE0		06C1004	45
13	392	FITBIR-DATA0014496	TBIBR360EWL		06C1003	63
14	392	FITBIR-DATA0014496	TBIBV552XZW		06C1001	34
15	392	FITBIR-DATA0014496	TBIDG482PX9		05C1216	42
16	392	FITBIR-DATA0014496	TBIRZ273YR2		06C1016	31
17	392	FITBIR-DATA0014496	TBIHX400NYG		06C1013	36
18	392	FITBIR-DATA0014496	TBIFA001JYG		06C1011	41
19	392	FITBIR-DATA0014496	TBIAL553PCD		05C1203	49
20	392	FITBIR-DATA0014496	TBIIMW968ARK		05C1202	39

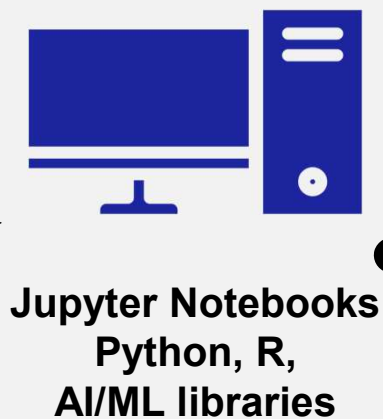
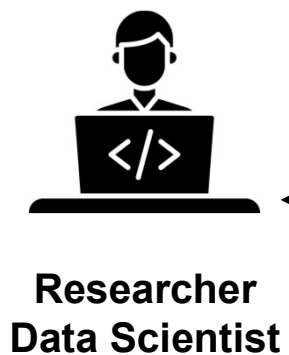
- Query *across* studies, CDEs, and data types
- API

API Query Tool

Programmatic access to the data

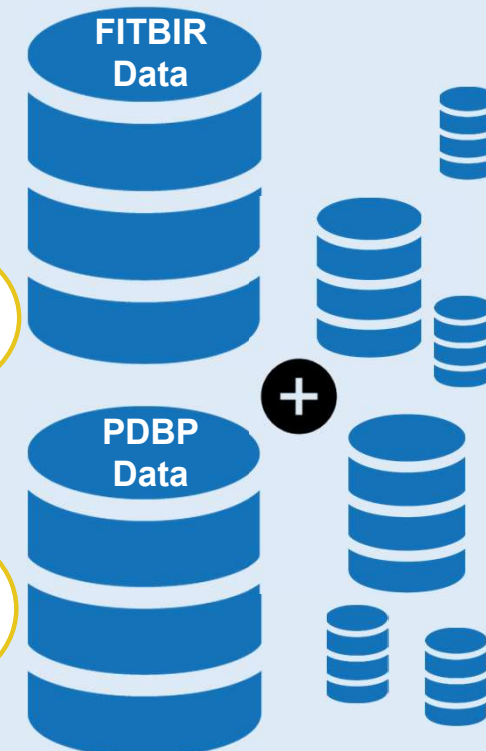
Authenticate RAS (11/2023)

- Query
- Retrieve data
- Analysis

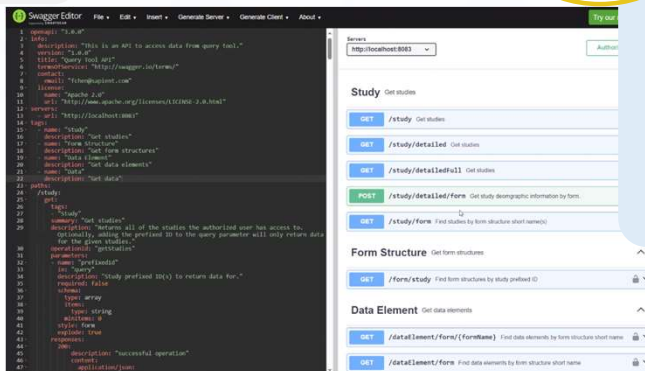


Rest
API

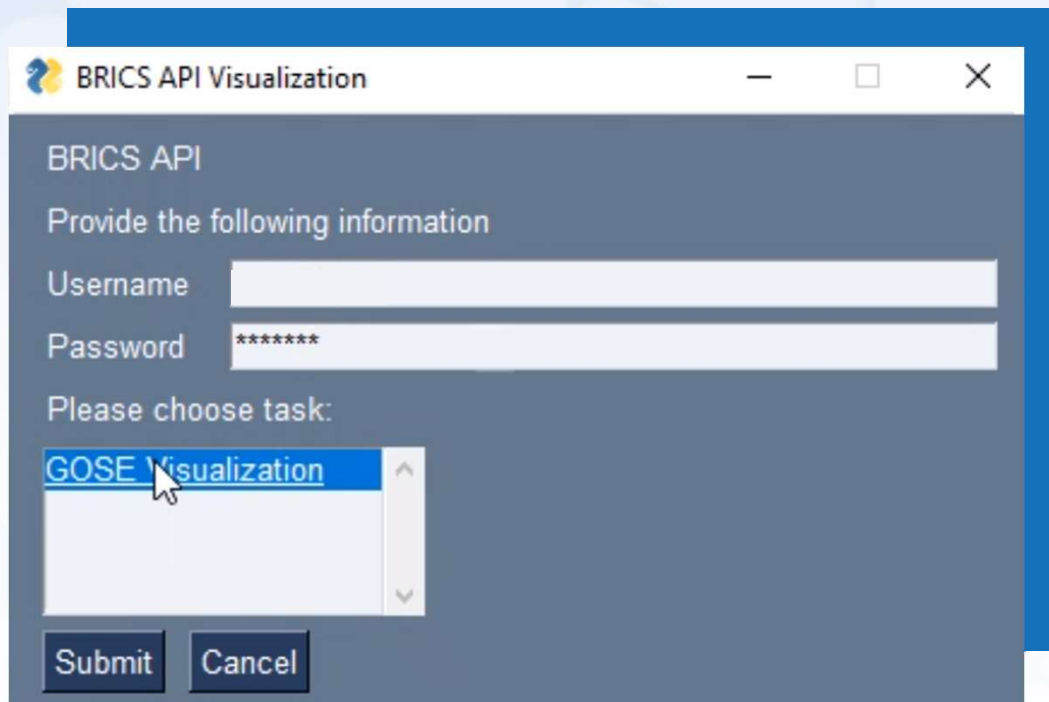
Rest
API



BRICS Informatics
Systems



Python Code



BRICS API Visualization

BRICS API

Provide the following information

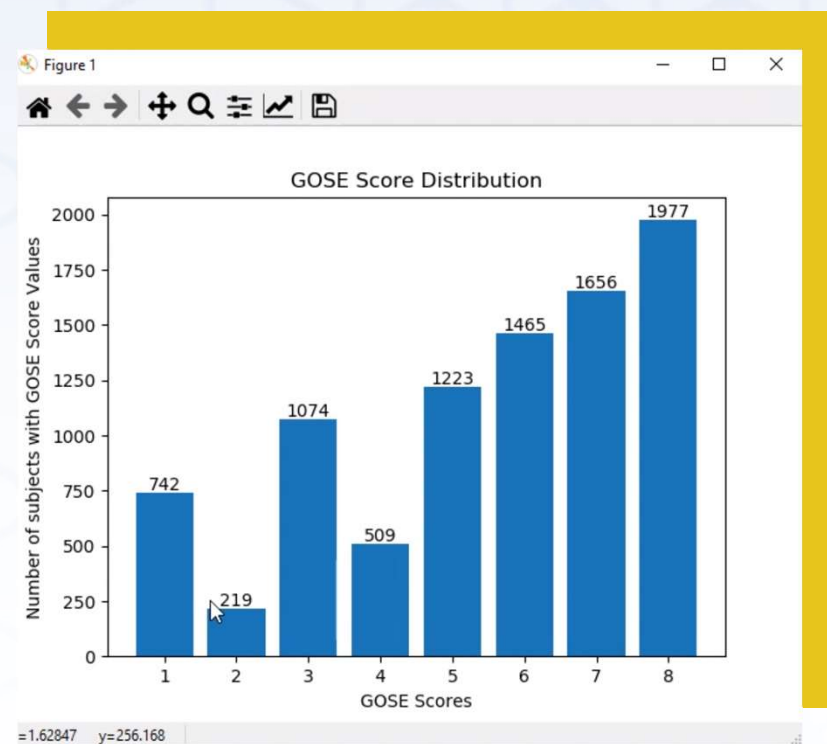
Username

Password

Please choose task:

GOSE Visualization

Submit Cancel





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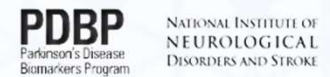
**Biomedical Research Informatics
Computing System (BRICS)**

National Institute on Aging (NIA) Pilot Project Query Tool Use Case

Dr. Saba Al-Sayouri
Data Scholar



MTBI²





Studies Overview

Study 1: Health &
Retirement Study (HRS)

Study 2: Health, Aging,
and Body Composition
Study (Health ABC)

**BRICS NIA
Platform**

Study 3: Minority Aging
Research Study
(MARS)

Study 4: Louisiana
Osteoporosis Study
(LOS)

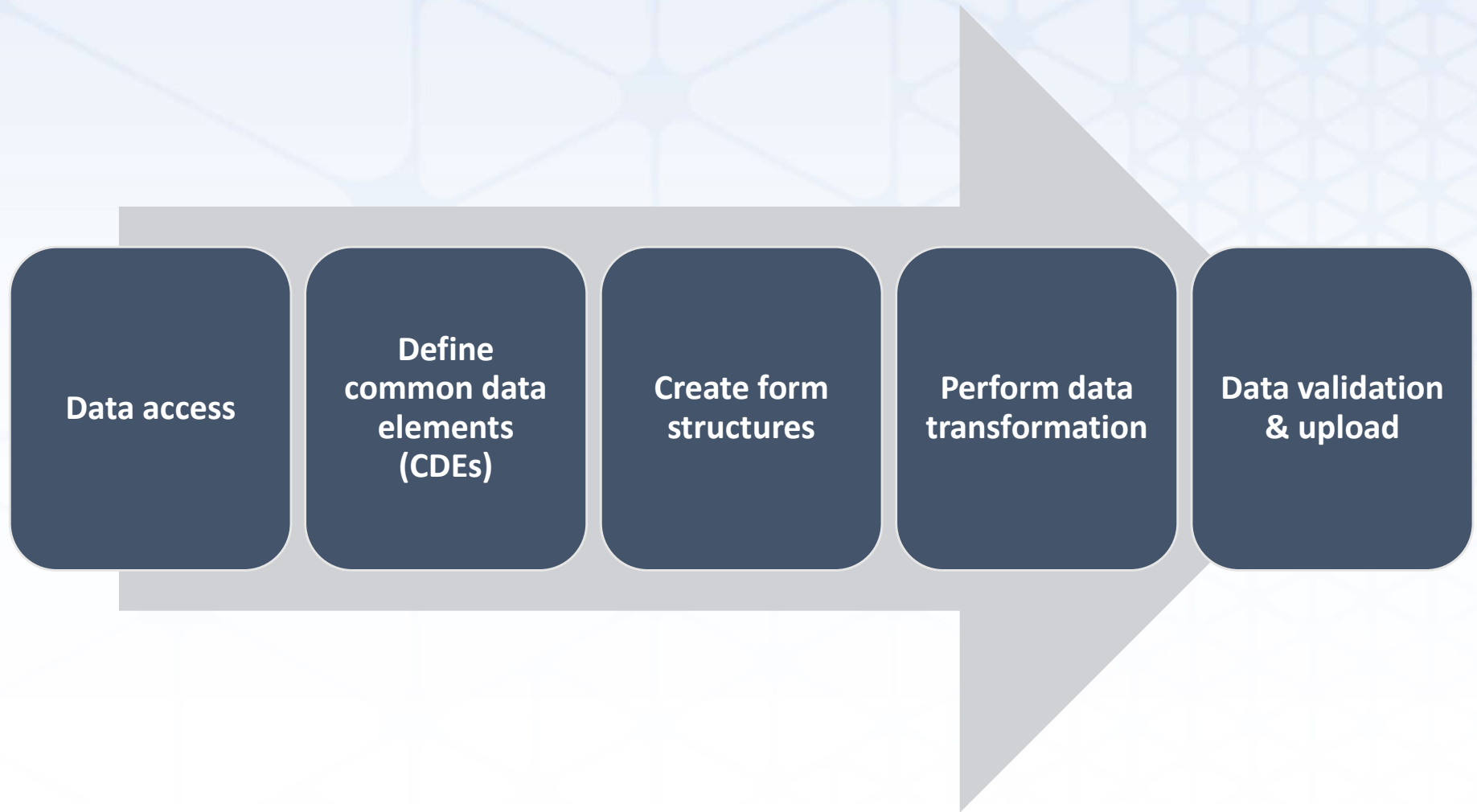


BRICS Added Value - Cohort Discovery

1. Assemble multi-level data collected across lifespan & providing framework for multi-disciplinary work
 - Expedite epidemiological discovery
2. Foster communication among investigators leading aging studies
3. Promote collaborative research projects for topics not easily addressed by single study



Extract Transform Load (ETL) Process Steps





ETL Process Step 1: CDE Definition

1. Accessed 4 studies data sets
2. Identified ~120 Common Data Elements (CDEs)
 - CDE: variable presents in 2+ studies
 - Iterative process: requires multiple phases of combing through data documentation & dictionaries

CDE Title	Health ABC	HRS	MARS	LOS
Data source				
Data source other				
General notes				
Language of form				
Site name				
Subject ID				
Visit date				
Year data collected				
Study year				

Snapshot of Data Inclusion Factsheet





ETL Process Step 2: Creating Form Structures

120 CDEs

NIA
Demographics
Form

NIA Medical
History Form

NIA Vital Signs
Form

Daily Living
and Physical
Ability Form



ETL Process Step 3: Data Transformation

- Similar CDEs collected differently across studies
 - Transformed data to fit into BRICS CDE definitions

Health ABC

Variable	General Descriptio	Value labels
DIFFPP	Difficulty pushing/pulling	0=No 1=Yes

HRS

How difficult is it for you to...

B4r. ...pull or **push** large objects like a living room chair? [IMPUTED]

V318 Code	Frequency
1	9303
2	1577
3	766
4	843
6	163



Yes

No

Harmonized



ETL Process Step 4: Data Validation & Upload

NIH National Institute on Aging

Welcome Administrator, Saba [Log Out](#)

Home Workspace ProFoRMS Subject Management Data Dictionary **Data Repository** Query Meta Study Account Management Forum

Menu

- Manage Studies
- Submission Tools
- Validate and Upload Tool**
- Image Packaging Tool
- Download Tool
- Data Repository Administration

Data Repository

Validate and Upload Tool (Submission Tool) - JavaScript Application

Getting started and need help? Download the [Submission Tools User Guide \(pdf\)](#)

Validation Tool **Upload Tool**

Working Directory

Upload Directory No file chosen **Choose Directory** **Load Directory**

To upload file with attached/associated files, choose 'Upload Directory'.

Files

Hidden files will not be displayed on this table. Exp: .DS_Store, Thumbs.db, desktop.ini

Color Legend ■ Requires Validation ■ Valid ■ Excluded ■ Error

Include Files **Exclude Files** Search:

NAME	TYPE	STRUCTURE	STATUS	RESULT	SUMMARY
No data available in table					

Showing 0 to 0 of 0 entries (0 row selected of 0)

Validate Files **Build Submission Package**



Where we Are Now?

- ~120 harmonized CDEs across 4 NIA studies grouped into 4 form structures reflecting 1 year of study data for **16,613** participants
 - Uploaded **all** years available data of MARS study
- We're able to query data across studies, with lots of flexibility in filtering
- We're able to download harmonized data from multiple studies with complete data dictionary





Future Work

1. Year 1 of HRS full data in process
 - Still in pilot phase, with all data remaining private
 - Ability to run analyses, with all data & documentation in clear, accessible, & easy to use format
2. Working on uploading data for harmonized CDEs for year 2 & across remaining 3 studies (HRS, Health ABC, & LOS)





Demo



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Questions?





BRICS

Biomedical Research
Informatics Computing System

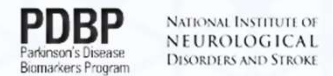
**Biomedical Research Informatics
Computing System (BRICS)**

Query Tool API & Data Visualization

Dr. Alexandra Bokinsky



MTBI²

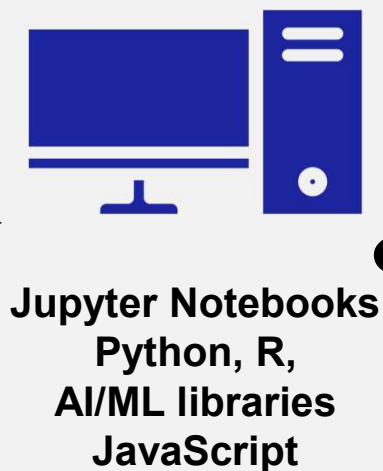


API Query Tool

Programmatic access to the data

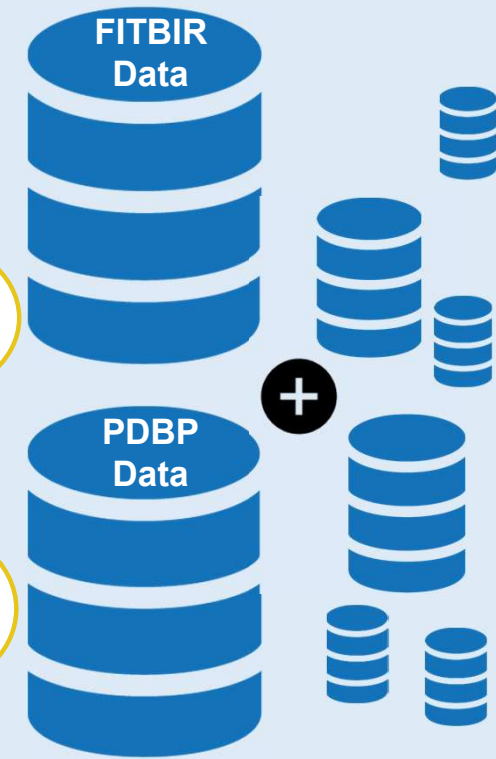
Authenticate RAS (11/2023)

- Query
- Retrieve data
- Analysis

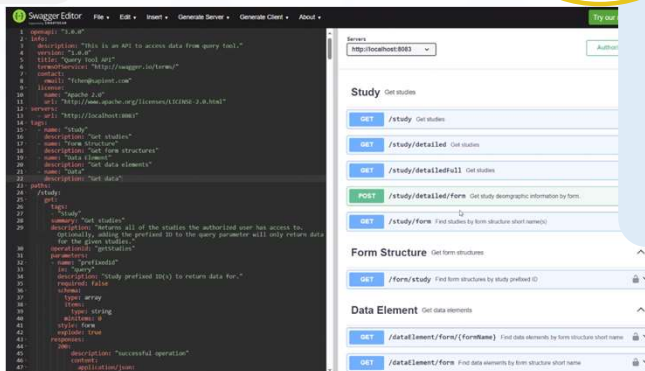


Rest
API

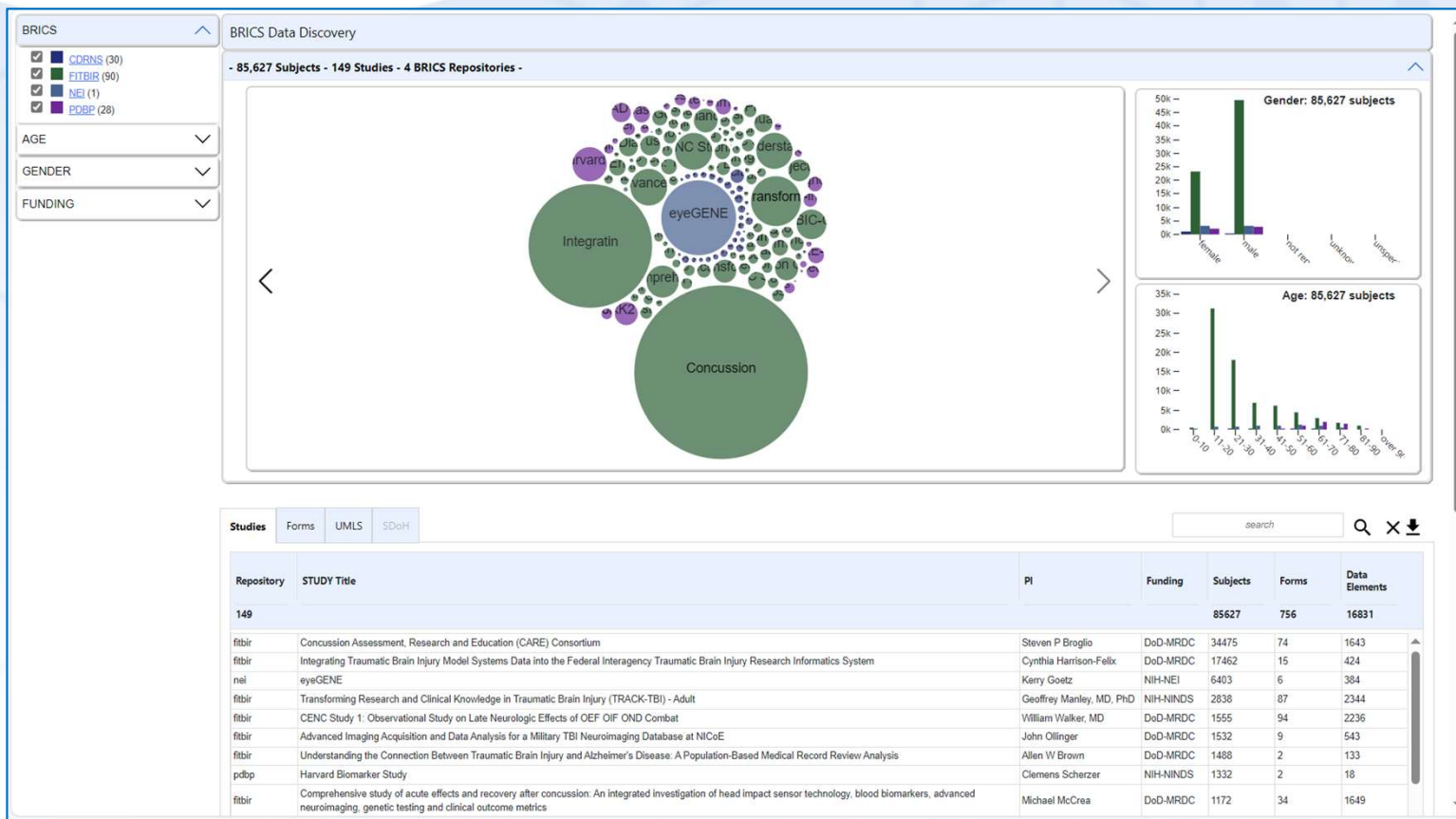
Rest
API



**BRICS Informatics
Systems**



Why would we want to use the API?



- ✓ Programmable access to the Query Tool includes all QT functionality
- ✓ Single program runs on any BRICS instance – same code!
- ✓ Easily build programs to search and integrate data across multiple BRICS instances



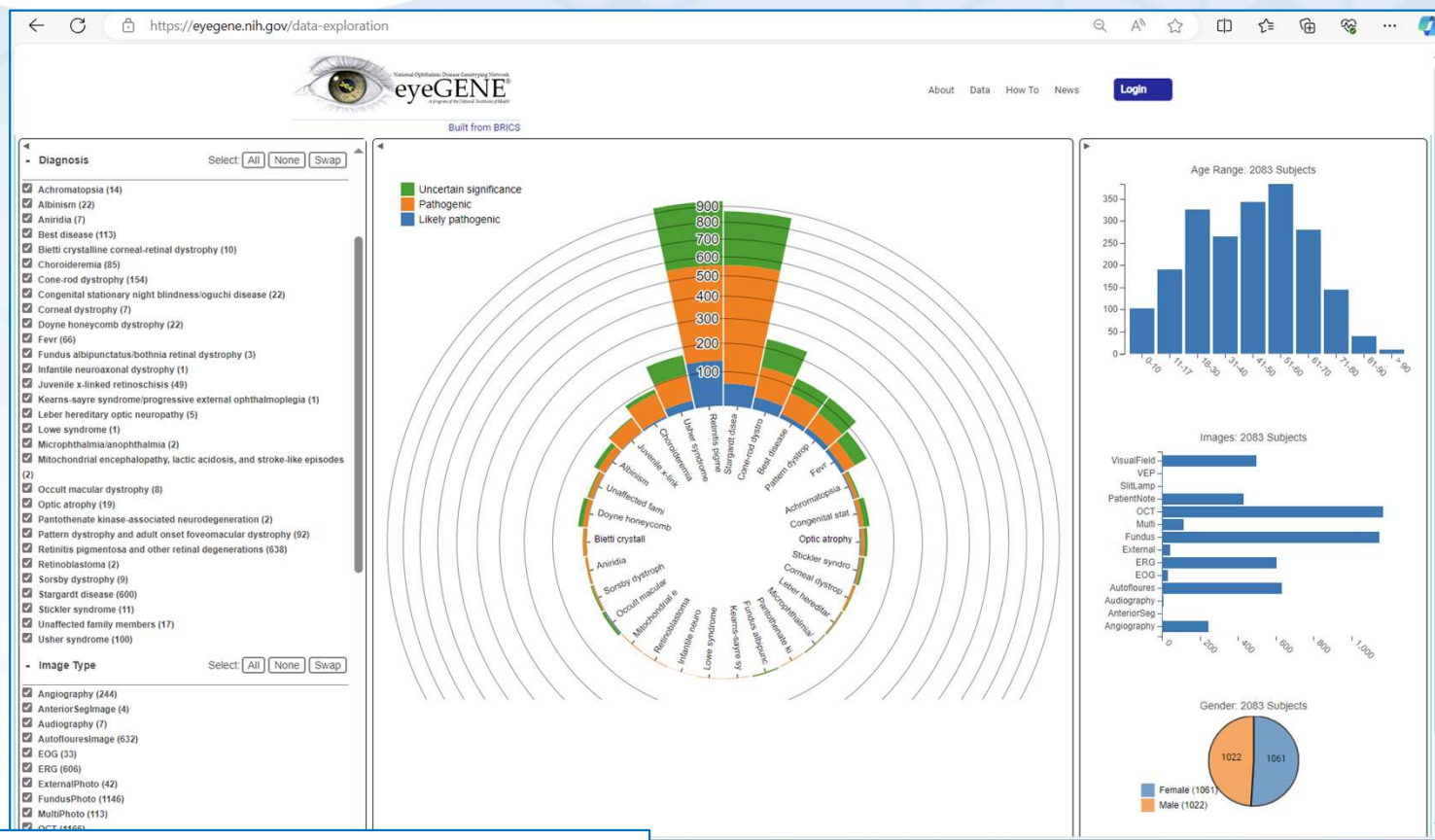
How do we use the API?



Each BRICS instance requires a unique RAS authentication token to access the Query API programmatically.

API calls are identical across instances – only the token and base url change

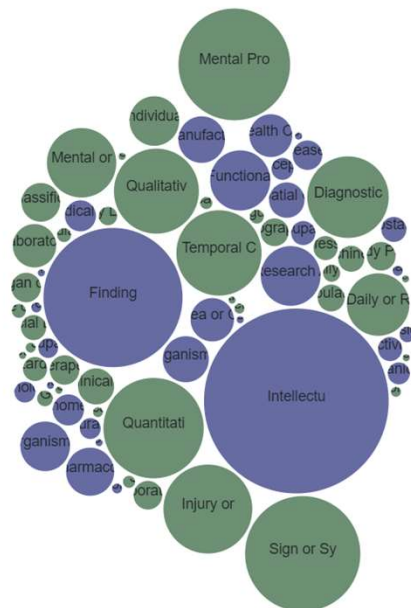
FITBIR: download activity over time by study, data type, and image modality



Log onto the BRICS workspace and navigate to Account Management

- Token expires after 30 minutes
- Renew token programmatically from the API: `/rasauth/user/extendApi`

Diagnostic information, by age, gender, image type, and gene variant



`/repository-api/study`

`/query-api/form/study?prefixedId=name`

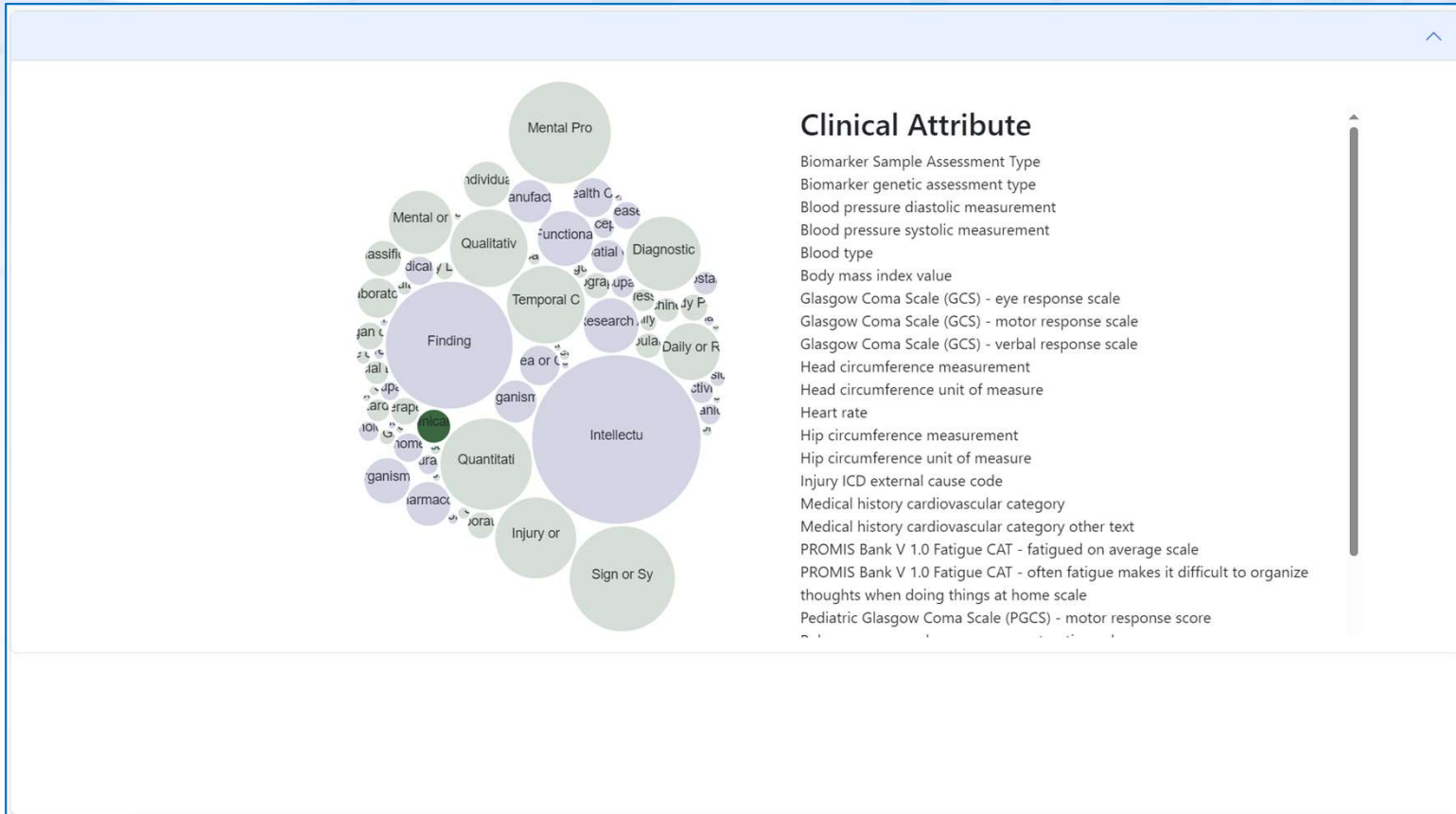
`/query-api/dataElement/form?formName=name`

`/dictionary-api/dataElement/getByNames`

- Repository-API: List studies available for a given BRICS instance
- **Query-API: List forms for a given study**
- **Query-API: List data elements for a given form**
- Dictionary-API: Return dictionary (including UMLS) information for a given CDE



What can we do with the API?



Data elements across BRICS sorted by
UMLS Semantic Type
Highlight: **Clinical Attribute**

The screenshot shows the FITBIR website interface. At the top, there is a navigation menu with links for HOME, ABOUT, DATA, HOW TO, POLICY, NEWS, EVENTS, FORUM, and a LOGIN button. The main content area is titled 'Mapping of Minimum GOS-E to Maximum GOS-E'. It features a chord diagram on the left and a table on the right. The chord diagram maps 8 minimum GOS-E categories to 8 maximum GOS-E categories. The table provides the following data:

Permissible Value	Description	Scores	
1	Dead	23	0
2	Vegetative State	19	0
3	Lower Severe Disability	40	0
4	Upper Severe Disability	9	0
5	Lower Moderate Disability	51	0
6	Upper Moderate Disability	90	232
7	Lower Good Recovery	0	0
8	Upper Good Recovery	0	0

Below the table, a caption reads: 'GOS-E scores and on the right are the maximum GOS-E scores. Each chord represents the number of individuals. Table shows minimum and maximum GOS-E for each subcategory.'

Output of API call is in JSON or CSV format:

```

"studyId": "string",
"forms": [
  {
    "id": 0,
    "shortName": "string",
    "title": "string",
    "version": "string"
  }
]
    
```

New ways of looking at and understanding data: **GOS-E**



Demo



BRICS

Biomedical Research
Informatics Computing System

Questions?





BRICS

Biomedical Research
Informatics Computing System

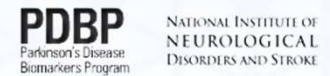
**Biomedical Research Informatics
Computing System (BRICS)**

BRICS APIs and Customizing Analysis Pipelines

Dr. Maria Bagonis
Data Scholar



MTBI²





API Query Tool

Programmatic access to the data

For Web Visualization Tools

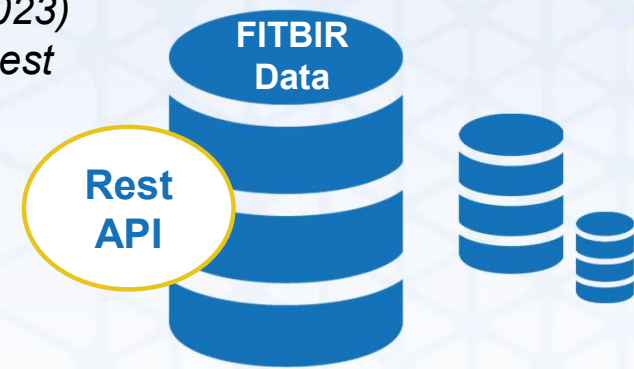

BRICS Web Developer
Or
Researcher
Data Scientist

Jupyter Notebooks
Python, R,
Java Script
AI/ML libraries

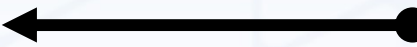
Authenticate RAS (11/2023)
Submit Query API Request



BRICS Informatics Systems



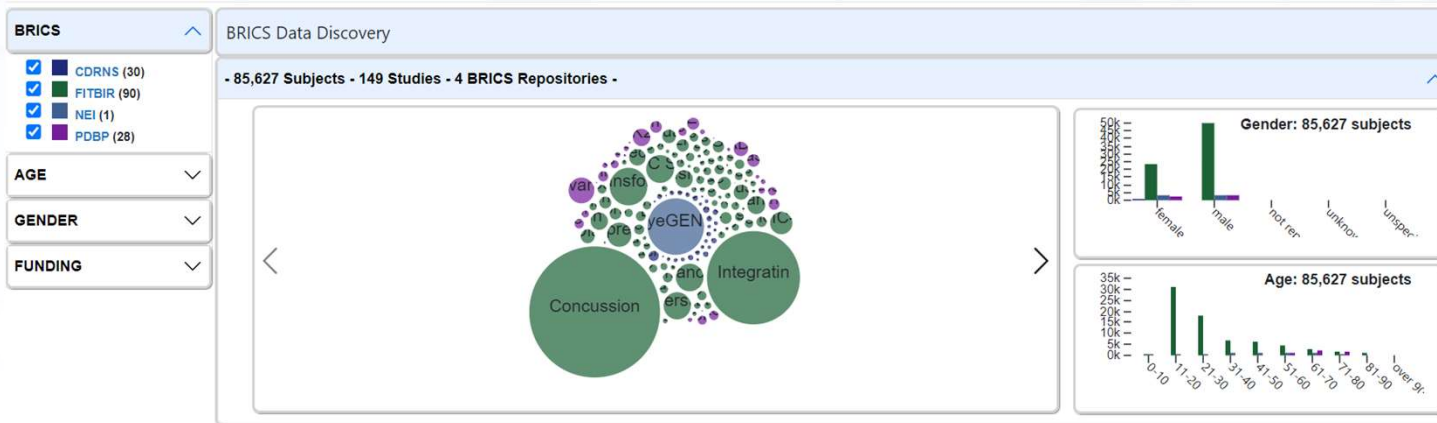
Retrieve Requested Data
Based on Input Parameters



BRICS DATA



Data Discovery Visualization Tools



<https://brics.cit.nih.gov/visualization>



API Query Tool

Programmatic access to the data For Customized Local Analyses

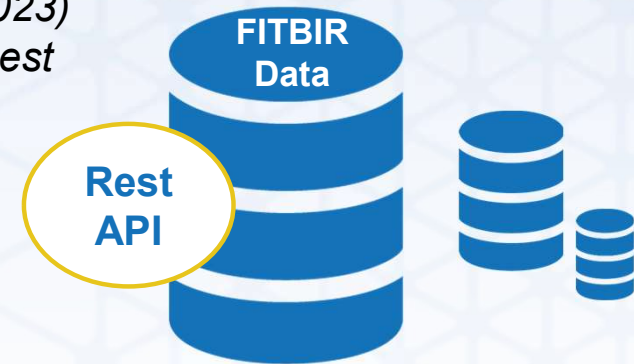


**Researcher
Data Scientist
YOU!**

Jupyter Notebooks
Python, R,
Java Script
AI/ML libraries

*Authenticate RAS (11/2023)
Submit Query API Request*

**BRICS Informatics
Systems**

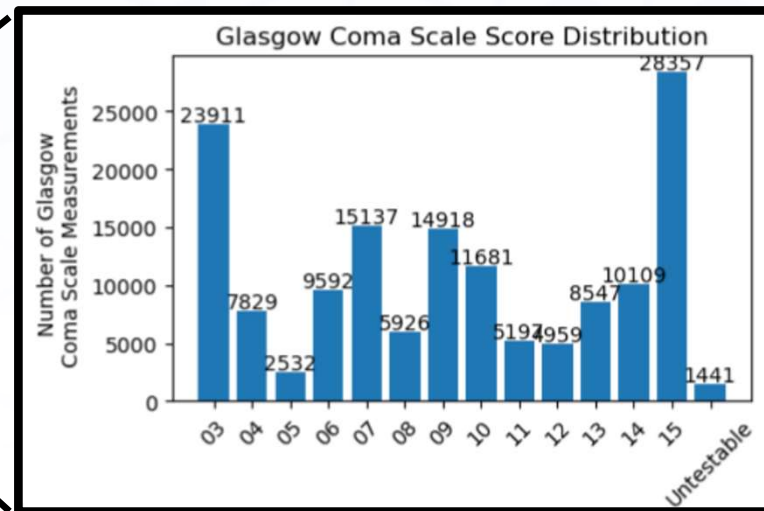
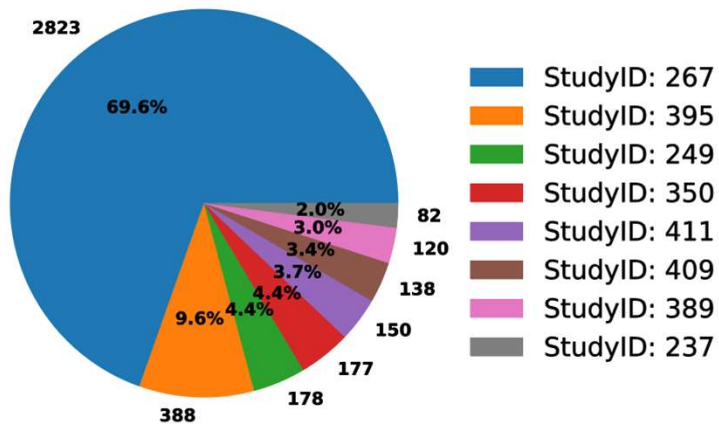


*Retrieve Requested Data
Based on Input Parameters*

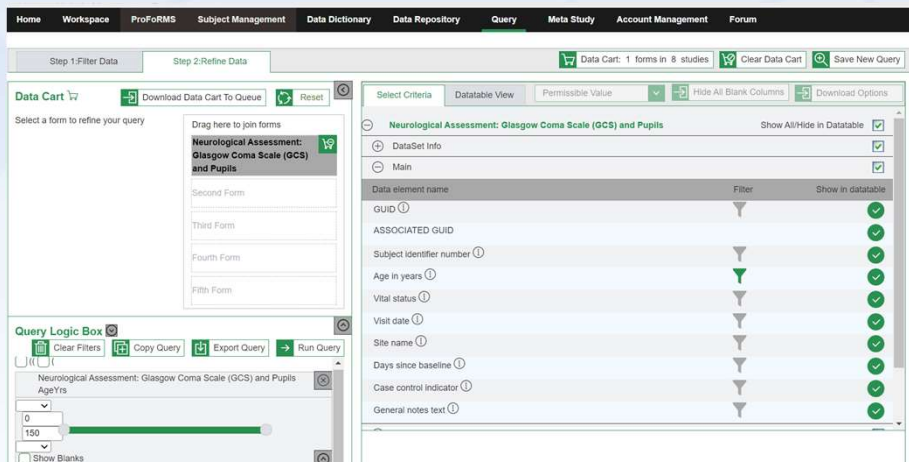
Locally Design Customized
Visualizations, Analyses, and
Cohort Generation Tools

BRICS DATA

of Subjects Per Study Using the GCS Form



Browser-Based Query Tool



User Guide: <https://brics.cit.nih.gov/sites/brics/files/2024-02/query-and-api-to-data-query-user-guide.pdf>

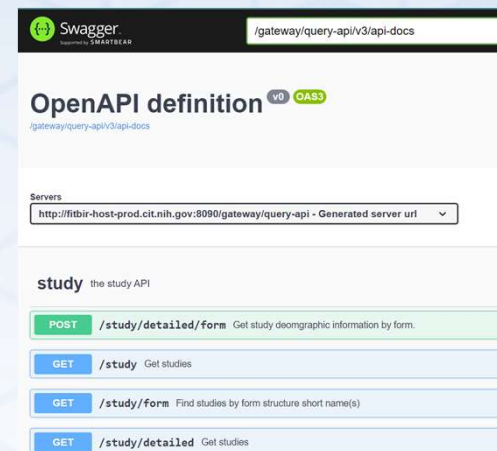
Tutorial Videos:

BRICS Query Tool Introduction:
<https://www.youtube.com/watch?v=pDukXHWfIBw>

BRICS Query Tool Step1: Filter Data:
<https://www.youtube.com/watch?v=uJ0HeLEGVQA>

BRICS Query Tool Step2: Refine Data:
<https://www.youtube.com/watch?v=8sL45VF7bx0>

API Endpoints



User Guide: <https://brics.cit.nih.gov/sites/brics/files/2024-02/query-and-api-to-data-brics-api-user-guide.pdf>

API Swagger Definitions: (ie where to find API endpoints)

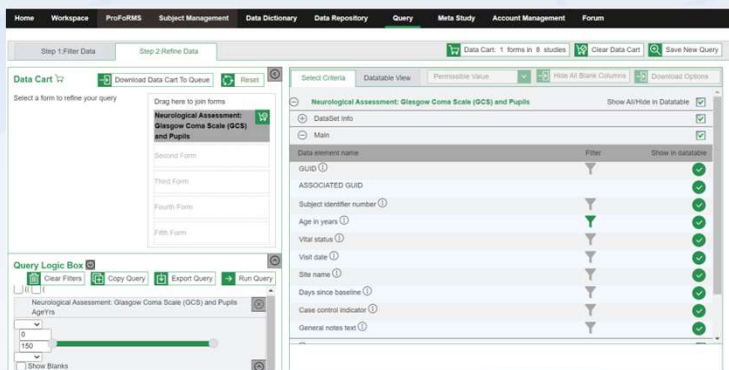
FITBIR: <https://fitbir.nih.gov/gateway/query-api/swagger-ui/index.html>

PDBP: <https://pdbp.ninds.nih.gov/gateway/query-api/swagger-ui/index.html>

NEI: <https://brics.nei.nih.gov/gateway/query-api/swagger-ui/index.html>

CdRns: <https://cdrns.nih.gov/gateway/query-api/swagger-ui/index.html>

Browser-Based Query Tool



API Endpoints



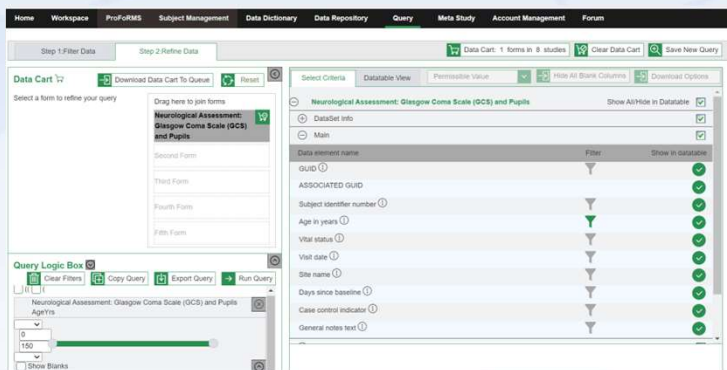
Designed with similar functionality

Things you can do:

- Find all form structures submitted for a study
- Find all studies using a specific form structure (ex. *Glasgow Coma Scale (GCS) form in FITBIR*)
- Query data across multiple studies and form structures
 - Filter results based on data element values (ex. *Age, Days Since Baseline, GCSTotal Score*)
 - Perform joins across form structures (ex. *GCS and Diffusion Imaging in FITBIR*)
- Download files associated with query results **Note: We are actively working on workflows for numerous large files (ie, imaging, etc)*

Difference between Browser and API Query Tool

Browser-Based Query Tool



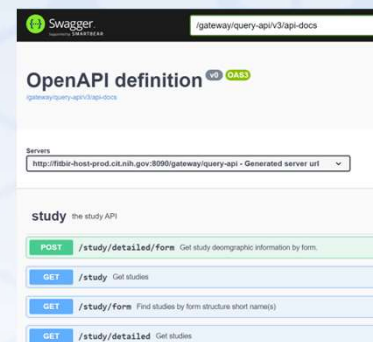
Graphical Interface Query

Check out BRICS Data to Cart

Download BRICS Data via Browser

Upload BRICS data into analysis software (Jupyter Notebook etc)

API Endpoints



*Allows Movement toward Automated Workflows/Pipelines

Command Line Query from analysis software (Jupyter Notebook etc)

Load BRICS data directly into analysis software (Jupyter Notebook etc)



Why would we want to use the API?

- **The API provides programmatic access to the Query Tool**
 - Data accessors can use the Query Tool services in their own programs & notebooks
- **Using the API extends the power of the Query Tool**
 - **Directly download** query results to any analysis software that supports REST APIs (Jupyter Notebook/python, R, java-script, etc)
 - **Instantly create** plots of BRICs data returned
 - **Customize** data analysis/transformation pipelines and easily apply them to multiple queries
 - **Share** archived queries and analyses with others.



Step I: Define Query URL (ie 'API endpoint'), Header, and Authorization Token

Define API headers and query URL

queryurl ="https://fitbir.nih.gov/gateway/query-api/data/csv"

#Typically Included in Request Header

#Accept - For specifying the type of content that can be accepted in a response. (json etc) See cor

#Content-type - For indicating the type of content that's included in the request body. (json etc)

#Authorization - in the format of 'Bearer ' + token

headers = {

'accept': 'application/zip', # note this cannot be 'application/csv' as it was in the old exam

'Content-type': 'application/json',

'Authorization': 'Bearer + token }

<https://fitbir.nih.gov/gateway/query-api/swagger-ui/index.html#/data/getInstancedDataCsv>



API Tokens

This token serves as your identity and access control to the entire system. This token is similar to a password and should be protected as such.

When making API calls, include this token in an Authorization header with the prefix "Bearer". For example:

Authorization: Bearer ABC.ABC123.123

Note the capital A in "Authorization", the capital B in "Bearer", and the space between the word "Bearer" and the token itself.

This communication complies with [RFC 6750](#).

The token itself is a JSON Web Token (JWT) which complies with [RFC 7519](#) and useful information, such as its expiration time, can be extracted from it. To renew the token, the following conditions must be met:

- The current token must not be expired. See the "exp" claim within the token for its expiration time.
- The underlying login session must not be more than 15 days since its initial web-interactive login.

To renew the token, make a webservice call with the following format:

GET /gateway/rasauth/user/extendapi
Host: this page's domain
Authorization: Bearer < This access token >

..... 

Step II: Define the Request Body (i.e. the Query Filter Information)

```
▶ #  
fitbirFormFilter = {  
  "formStudy": [  
    {  
      "form": formName  
    }  
  ]  
}
```

Defined on Swagger Website:

Ex. See Here <https://fitbir.nih.gov/gateway/query-api/swagger-ui/index.html#/data/getInstancedDataCsv> for more information regarding acceptable request body formats

Step III: Run the Query

```
#Post filter to Query API-  
%time query = requests.post(queryurl,headers=headers,json=fitbirFormFilter)
```



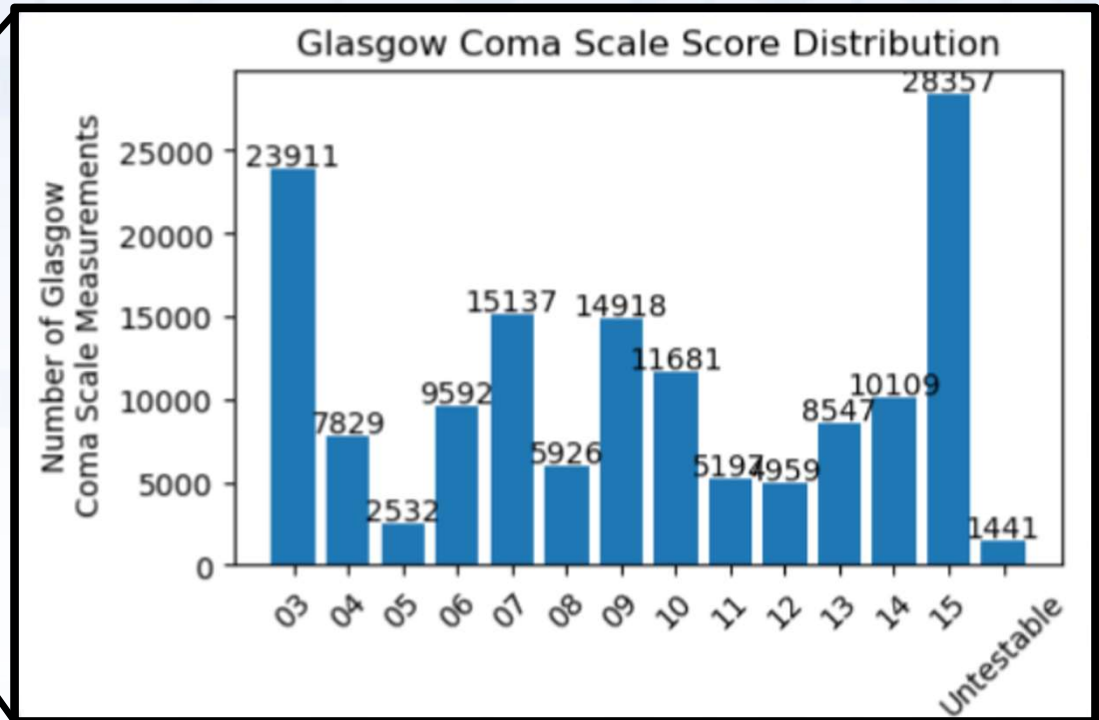
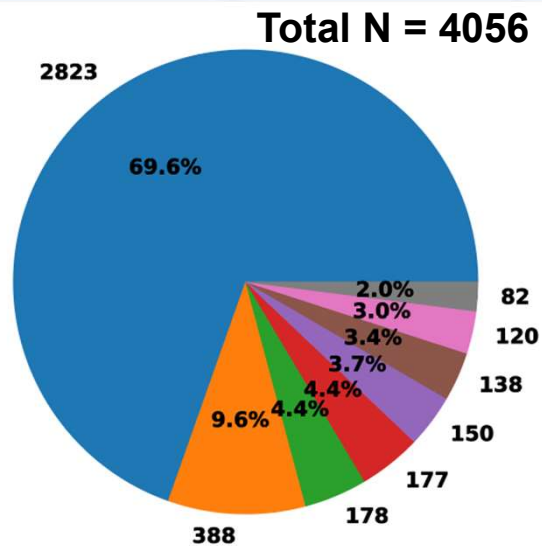
Develop Local Custom Visualization, Analyses, Cohort Generation Pipelines!



API Query Tool Examples of Customized Visualization

Find all studies in an instance of BRICs (ex. *FITBIR*) using a specific form (ex. *Glasgow Coma Scale*)
View the Distribution of Data Element Values (ex. *GCS Total Score*) among those studies

Subjects Per Study Using GCS Form



FITBIR Studies

Geoffrey Manley, MD, PhD: Transforming Research and Clinical Knowledge in Traumatic Brain Injury (TRACK-TBI) - Adult -StudyID:267

- Tellen Bennett: PEDiatric vALidation of vARiableS in TBI (PEDALFAST) -StudyID:395
- Claudia Robertson, MD: Effects of Erythropoietin on Cerebral Vascular Dysfunction and Anemia in Traumatic Brain Injury -StudyID:249
- Claudia Robertson, MD: Mission Connect Mild TBI Research Consortium -StudyID:350
- David Okonkwo, MD, PhD: Transforming Research and Clinical Knowledge in TBI (TRACK-TBI) - High Definition Fiber Tracking Neuroimaging, Biospecimen, and Data Informatics Repositories -StudyID:411
- Geoffrey Manley, MD, PhD: Transforming Research and Clinical Knowledge in Traumatic Brain Injury (TRACK-TBI) - Pediatric -StudyID:409
- Jed Hartings: Development and validation of spreading depolarization monitoring for TBI management -StudyID:389
- Geoffrey Wright: Development and Validation of the Virtual Environment TBI Screen (VETS) for Postural Control Testing -StudyID:237

See Python Notebook:
BRICSAPIDemo_CollectDataByForm.ipynb

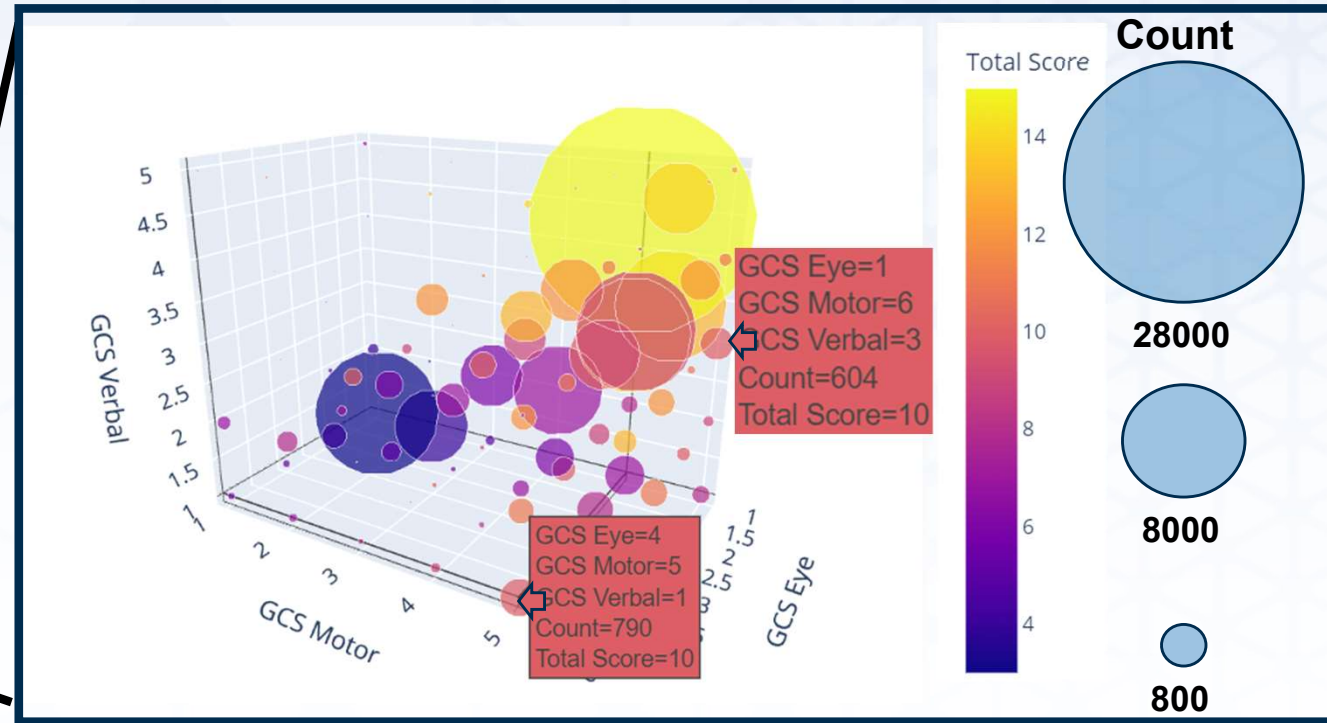
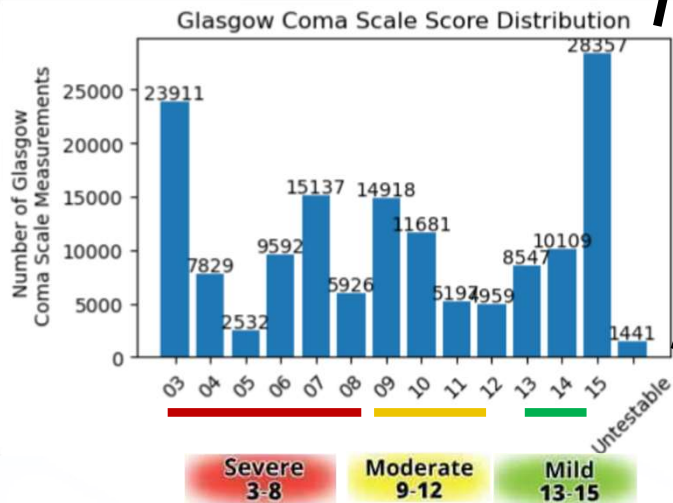


API Query Tool Examples of Customized Visualization

Large Sample Sizes Afforded by Combining Data Among Multiple Studies Can Reveal Important Heterogeneity in the Patient Population and Ensure Sampling of Less Common Sub-populations

Glasgow Coma Scale

EYE OPENING		VERBAL RESPONSE		MOTOR RESPONSE	
Spontaneous >	4	Orientated >	5	Obey commands >	6
To sound >	3	Confused >	4	Localising >	5
To pressure >	2	Words >	3	Normal flexion >	4
None >	1	Sounds >	2	Abnormal flexion >	3
		None >	1	Extension >	2
				None >	1



See Python Notebook: BRICSAPIDemo_CollectDataByForm.ipynb

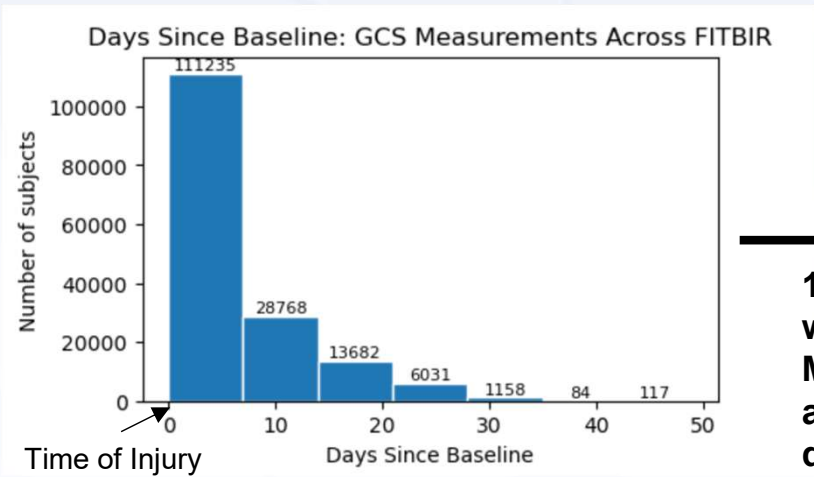


API Demo



API Query Tool Examples of Customized Visualization (Extra)

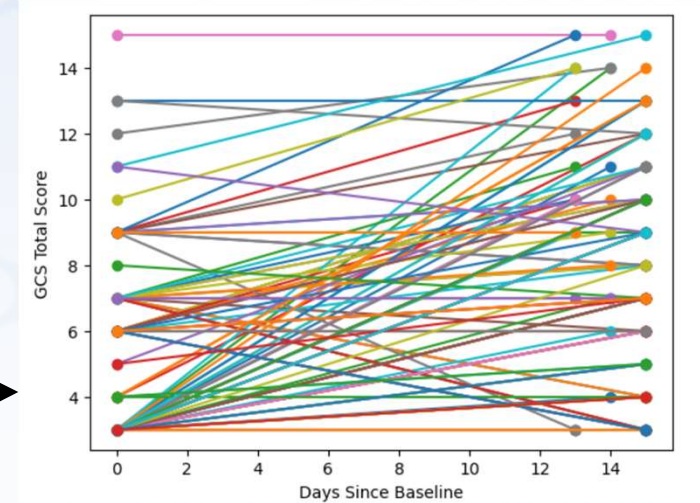
Extracting Temporal Measurements:
Glasgow Coma Scale (GCS) Measurements Taken at
Different Times Since Injury



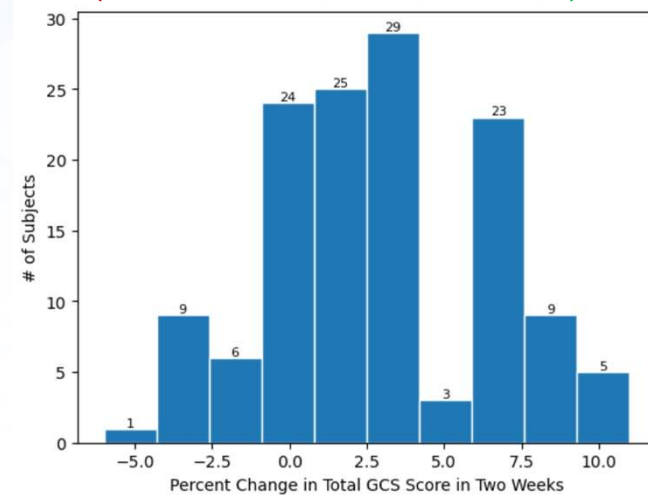
**134 Subjects
with GCS
Measured BOTH
at 0 and ~14
days after injury**

**At Time
of Injury**

**Two Weeks
Post Injury**



Worsened ← **Improved** →

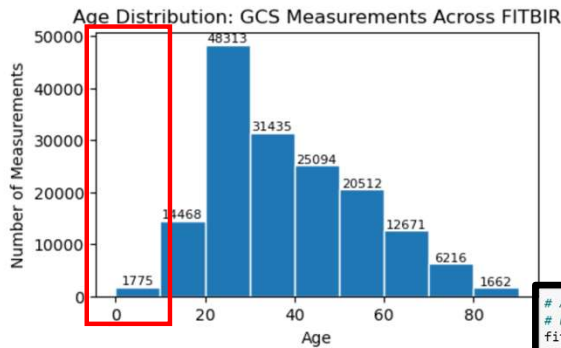


See Python Notebook:
BRICSAPIDemo_CollectDataByForm.ipynb

API Query Tool

Examples of Customized Visualization (Extra)

Find all studies using a specific form structure and filter by Data Element Value as defined by `form.repeatableGroup.dataElement` (i.e GCS.Main.AgeYrs)

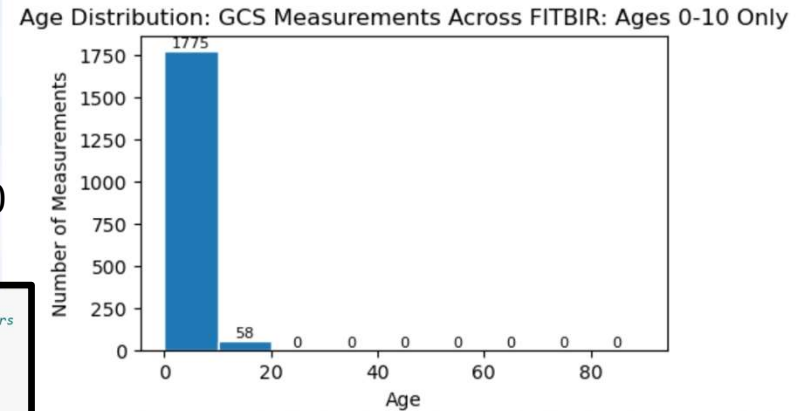


Create Pediatric Filter

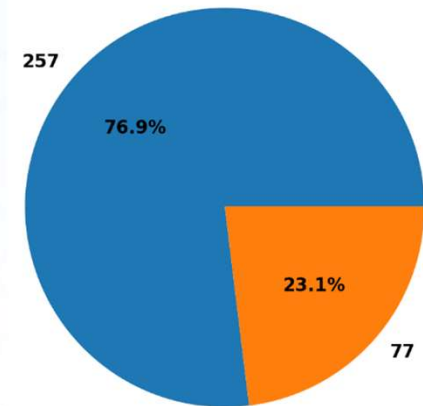


Only Download Data: Ages 0-10



```
# Age Filter 0-10
# Note Data Element Defined formName.repeatableGroup.dataElementName: Ex GCS.Main.AgeYrs
fitbirDataElementFilter = {
  "formStudy": [
    {
      "form": GCS #"string",
      "studies": [
        "string"
      ]
    }
  ],
  "filter": [
    {
      "form": 'GCS', # string
      "repeatableGroup": 'Main', #"string"
      "dataElement": 'AgeYrs', #"string"
      "rangeStart": "0", #string
      "rangeEnd": "10", #string
      "mode": "inclusive",
    }
  ]
}
```



Subjects Per Study Using GCS Form



See Python Notebook:
 BRICSAPIDemo_CollectDataByForm_WithDataElementValueFilter.ipynb

-  Tellen Bennett: PEDiatric vALidation of vARIABLES in TBI (PEDALFAST) -StudyID:395
-  Geoffrey Manley, MD, PhD: Transforming Research and Clinical Knowledge in Traumatic Brain Injury (TRACK-TBI) - Pediatric -StudyID:409

API Query Tool

Examples of Customized Visualization (Extra)

Find all studies using **BOTH ImagingDiffusion** and **GCS** forms:

id		title	pi
FITBIR-STUDY0000411	Transforming Research and Clinical Knowledge in TBI (TRACK-TBI) - High Definition Fiber Tracking Neuroimaging, Biospecimen, and Data Informatics Repositories		David Okonkwo, MD, PhD
FITBIR-STUDY0000409	Transforming Research and Clinical Knowledge in Traumatic Brain Injury (TRACK-TBI) - Pediatric		Geoffrey Manley, MD, PhD
FITBIR-STUDY0000267	Transforming Research and Clinical Knowledge in Traumatic Brain Injury (TRACK-TBI) - Adult		Geoffrey Manley, MD, PhD

Find all studies using **BOTH Biomarker** and **ImagingFunctionalMR** forms:

id		title	pi
FITBIR-STUDY0000411	Transforming Research and Clinical Knowledge in TBI (TRACK-TBI) - High Definition Fiber Tracking Neuroimaging, Biospecimen, and Data Informatics Repositories		David Okonkwo, MD, PhD
FITBIR-STUDY0000310	Concussion Assessment, Research and Education (CARE) Consortium		Steven P Broglio
FITBIR-STUDY0000409	Transforming Research and Clinical Knowledge in Traumatic Brain Injury (TRACK-TBI) - Pediatric		Geoffrey Manley, MD, PhD
FITBIR-STUDY0000279	Comprehensive study of acute effects and recovery after concussion: An integrated investigation of head impact sensor technology, blood biomarkers, advanced neuroimaging, genetic testing and clinical outcome metrics		Michael McCrea
FITBIR-STUDY0000267	Transforming Research and Clinical Knowledge in Traumatic Brain Injury (TRACK-TBI) - Adult		Geoffrey Manley, MD, PhD
FITBIR-STUDY0000384	TBI Endpoints Development (TED)		Geoffrey Manley

See Python Notebook: [BRICSAPIDemo_FindStudiesUsingTwoOrMoreCommonForms.ipynb](#)

Not the form you are looking for?: Interactively Search All FITBIR Forms via the web interface here: <https://fitbir.nih.gov/content/data-dictionary#form-structures>



API Query Tool

Examples of Customized Visualization

Insert Your Visualization Here!

BRICS API Manual (PDF): <https://brics.cit.nih.gov/sites/brics/files/2024-02/query-and-api-to-data-brics-api-user-guide.pdf>

BRICS API Manual (Jupyter Notebook): <https://brics.cit.nih.gov/sites/brics/files/2024-02/query-and-api-to-data-brics-api-user-guide.ipynb>

All demo notebooks from today's webinar are located at
<https://brics.cit.nih.gov/documentation> in the **Query and API to Data - API Scripts Zip File**

Questions/Comments?

Additional Questions/Comments/Suggestions

Contact: maria.bagonis@nih.gov

Share your voice and be part of the community!





BRICS

Biomedical Research
Informatics Computing System

Closing Remarks

