



BRICS

Biomedical Research
Informatics Computing System

BRICS Demo PPRL and Data Repository

Biomedical Research Informatics Computing System (BRICS)

January 11th, 2024



MTBI²



NATIONAL INSTITUTE OF
NEUROLOGICAL
DISORDERS AND STROKE





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)
9:00-9:15	Introduction	Dr. Matthew McAuliffe
9:15-9:30	Overview on PPRL/GUID	Rakib Tuhin Zaman
9:30-9:40	Get to know BRICS Data Repository	Michelle Harris
9:40-9:50	Demonstration on Data Repository Validation and Submission	Michelle Harris
9:50-10:00	Questions & Closing Remarks	Dr. Matthew McAuliffe



BRICS - Brief Introduction

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

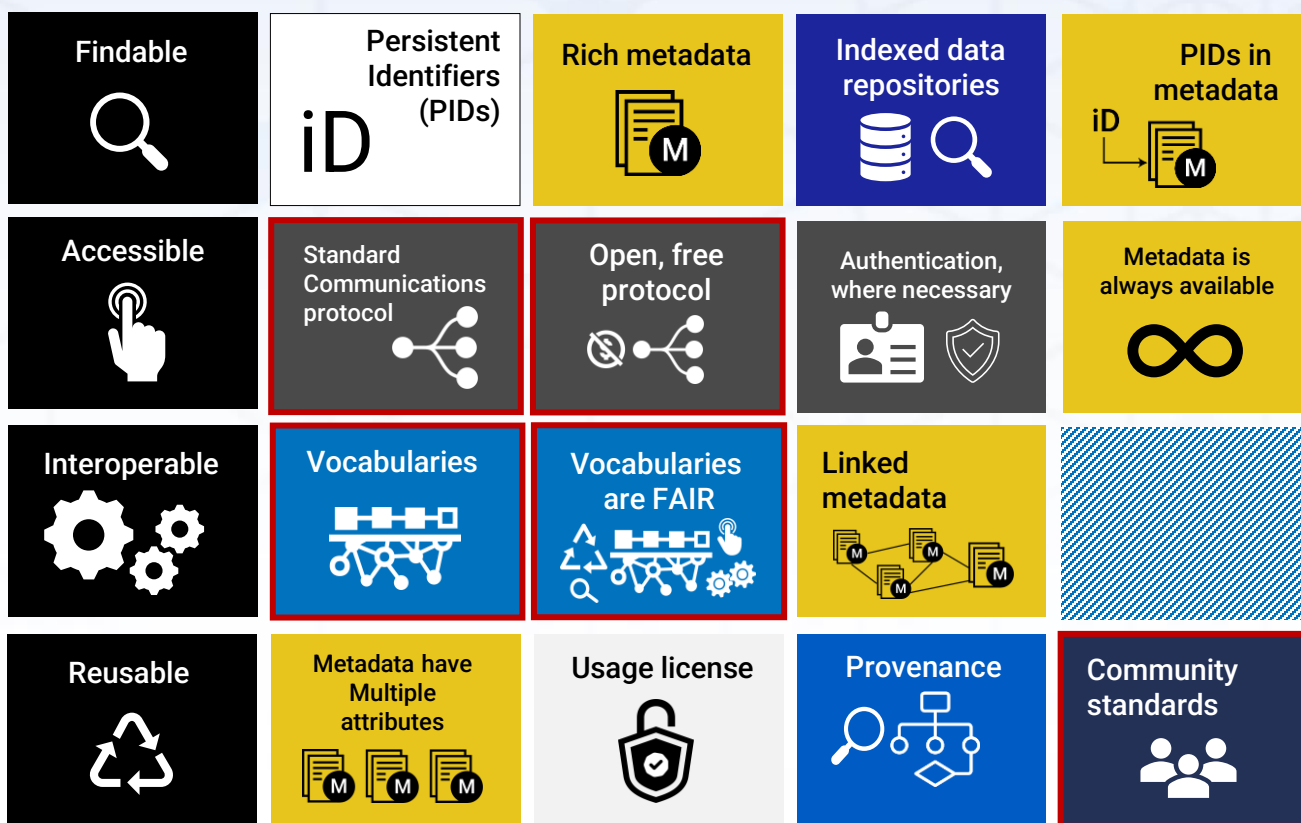
[Home | BRICS \(nih.gov\)](https://brics.nih.gov)
<https://brics.cit.nih.gov>



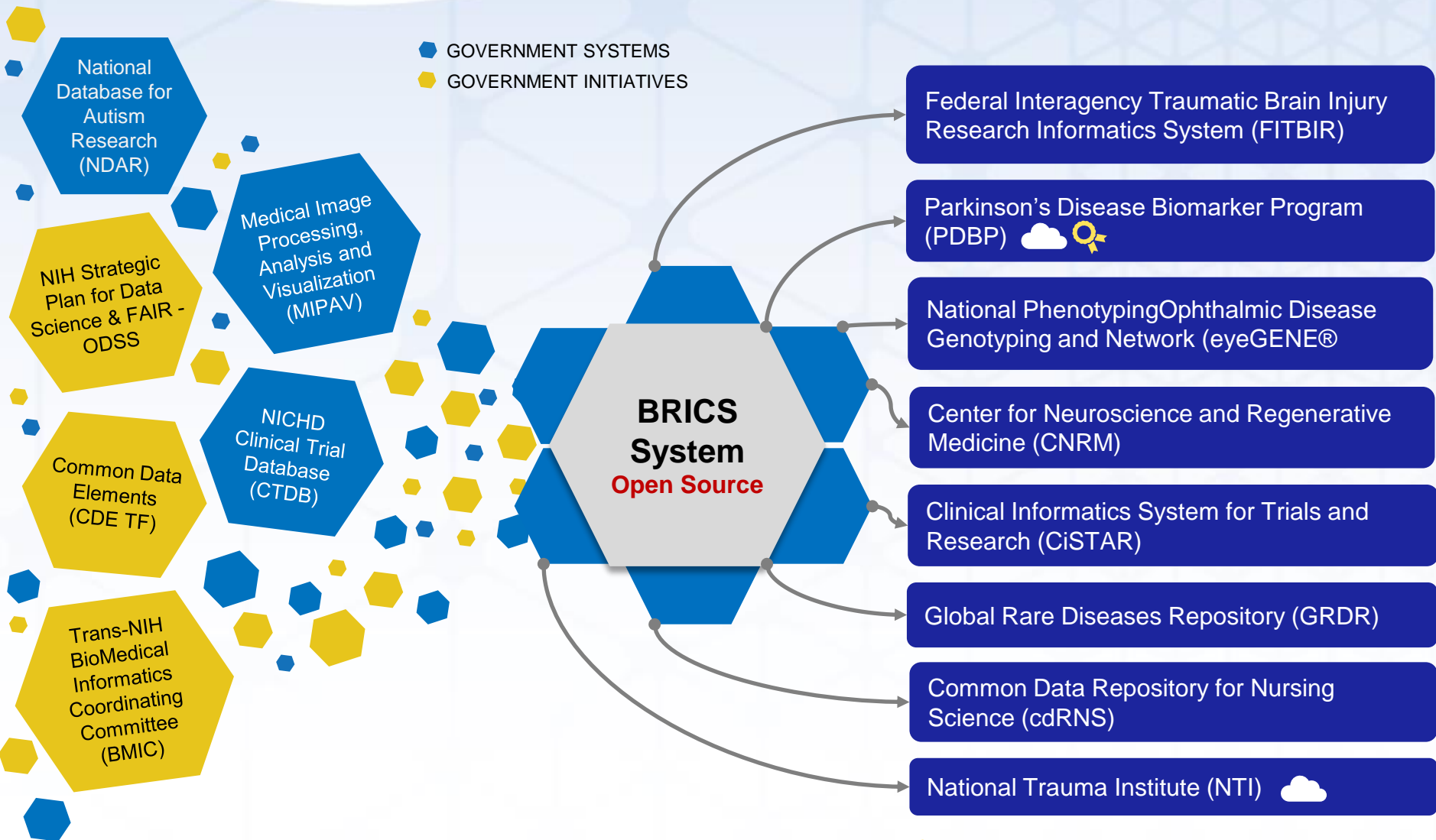
MTBI²



















Committed to compliance with Findability, Accessibility, Interoperability, and Reusability (FAIR) principles for scientific data.



Building from existing projects



 14th Annual Excellence.gov Awards Overall winner

							
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

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.



(RAS) PHASE 1a: (Live since November 2023)

- The traditional username/password Log in flow for BRICS has been replaced by NIH's Researcher Auth Service (RAS).
- This change requires all users to follow a set of steps to Log in/sign up for RAS and link their BRICS account to their RAS account.
- BRICS|RAS integration currently supports 2 identity providers:
 - NIH and DoD PIV/CAC card
 - Authenticator App
 - Login.gov

RAS PHASE 1b: (May 2024)

- Include additional Identity Providers and PIV cards from other agencies as needed.
- Enhancement requests and defect fixes that come from the users based upon the initial release





The **Raven** release aimed at improving the functionality and user experience across various modules and components of our system. The release incorporates a comprehensive set of changes for the **Meta Study** module. The team also upgraded the application to **Java 17** version which was a major accomplishment and worked on several tech initiatives and performance optimizations across the application. Here are a few other details pertaining to the release:

Meta Study:

- Added robust File Upload and Download capability for large file sizes under the Data Tab
- Enhanced the usability by changing the UI to tabular structure
- Added additional columns and search filters
- Introduced the Meta Study Admin interface for better managing the workflows

Submission Tool Enhancements:

- Modified the logic to upload multiple datasets independently so that if any of the submissions fail, the previous successful uploads do not need to be resubmitted
- Reduced time user needs to spend in the submission tool by uploading the user files first and letting the data loader run/complete later thus allowing the users to exit the page sooner
- Added the capability to continue with the file upload after a minor network disruption
- Added a feature to automatically sanitize invalid XML characters that used to get added when data was imported through another system
- Optimized the load and validate time for a dataset with 25k associated files



**ProFoRMS Enhancements:**

- Added Print button to eForms under the My Visit Types page
- Added the auto-complete search feature to the GUID and Visits Type in "Schedule Visit"
- Added an icon to show fields that are pre-populated during the Data Collection

Data Dictionary Enhancements:

- Removed default selection from the Disease Dropdown when creating a Form Structure
- Added the capability to maintain CDE UMLS CUIs in the same order as provided in csv during data element import

Data Repository Enhancements:

- Organized the fields/labels for better workflow
- Added the Permissions tab to the study view for Study specific users and admins
- Made the Approved Data Submission Document optional for PDBP, cdRNS and NEI
- Updated the text for the Download Manager notification email by adding the location on it.
- Data Repository Admin Report
 - Added Study Title (column) to the Study Information Report
 - Added more columns to the Study Submission Report
 - Data Repository API - Added a new API to return dataset information without Dataset File-Set



**Query Tool Enhancements:**

- Made the "Hide Not Available" checkbox checked by default.
- Added tooltip to GUID and Orderable-Biosample ID filters letting the user know the entry limit
- Updated the wording of the error message for the Knowledge Graph option for DEs that are not applicable

Accounts Module Enhancements:

- Added a checkbox for Private Groups Permissions to show/hide the groups when requesting accounts
- Updated the Query Tool API permission so that it is granted to the user when they request the Query Tool privilege. This would help the users view the imaging data using Volview in Query Tool



Raven Minor Release: (February 2024)

- CASA Merge: Harmonize the code changes from CASA and CiSTAR instances
 - Add the capability to import Form Structures using the JSON format
 - Optimize the Data Dictionary searches and filters
 - Security Updates
-

Spiderman Release: (May 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 and Query Tool modules
- Centralized GUID Enhancements
- Tech library updates as needed
- Various UI and feature enhancements across the BRICS modules





The screenshot displays the BRICS system interface. At the top, the FITBIR logo and navigation menu are visible. The main content area is titled 'Workspace' and features a section 'Modules: Building Blocks for the Research Life Cycle'. Below this, eight module icons are arranged in a grid. The 'Subject Management' and 'Data Repository' icons are highlighted with yellow boxes. A yellow banner at the bottom of the screenshot reads: 'Demo on Subject Management (PPRL/GUID) and Data Repository modules'.



BRICS

Biomedical Research
Informatics Computing System

Biomedical Research Informatics Computing System (BRICS)

PPRL/GUID

Rakib Tuhin Zaman



MTBI²





Privacy Preserving Record Linkage (PPRL) Global Unique Identifier System (GUID)

[1] Johnson SB, Whitney G, McAuliffe M, Wang H, McCreedy E, Leon Rozenblit L, Evans CC. Using Global Unique Identifiers to Link Autism Collections. J. Am. Med. Inform. Assoc., Vol. 17, No. 6, 689-695, 2010. PMID: PMC3000750.



Global Unique Identifier System

- Creates unique random subject identifiers without exposing personally identifiable information (PII)
- Protects privacy of each research participant
- Associates participants across data types and studies

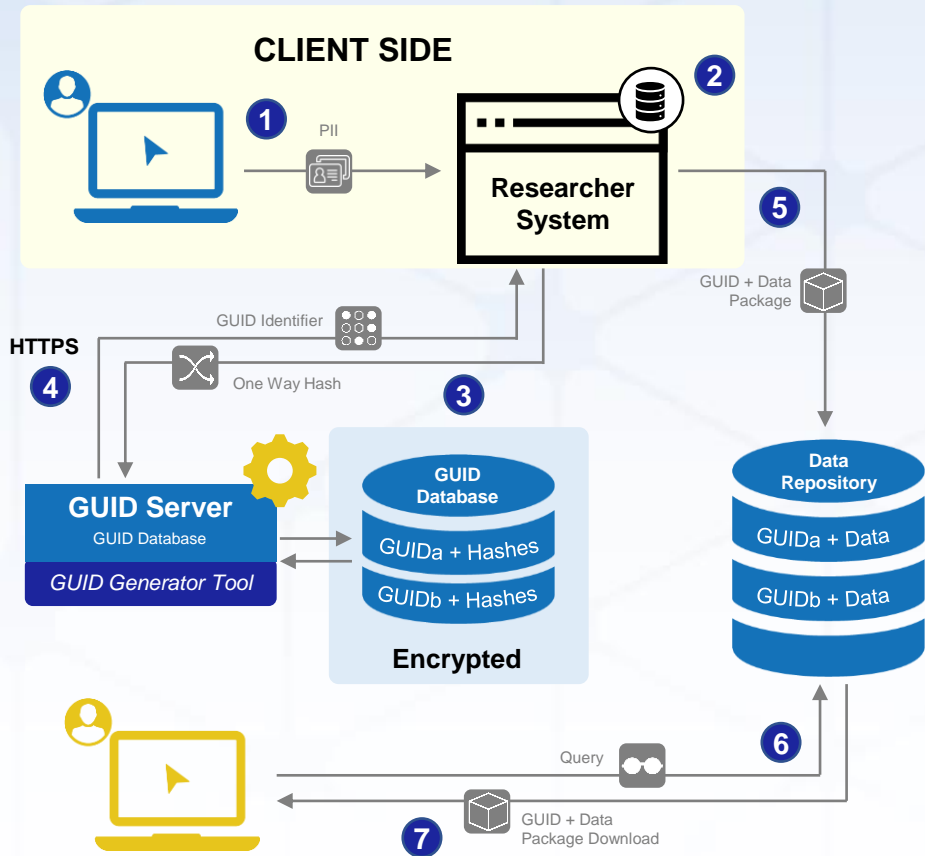
Helps researchers

- Aggregate data for specific study participants over time and space





GUID Process

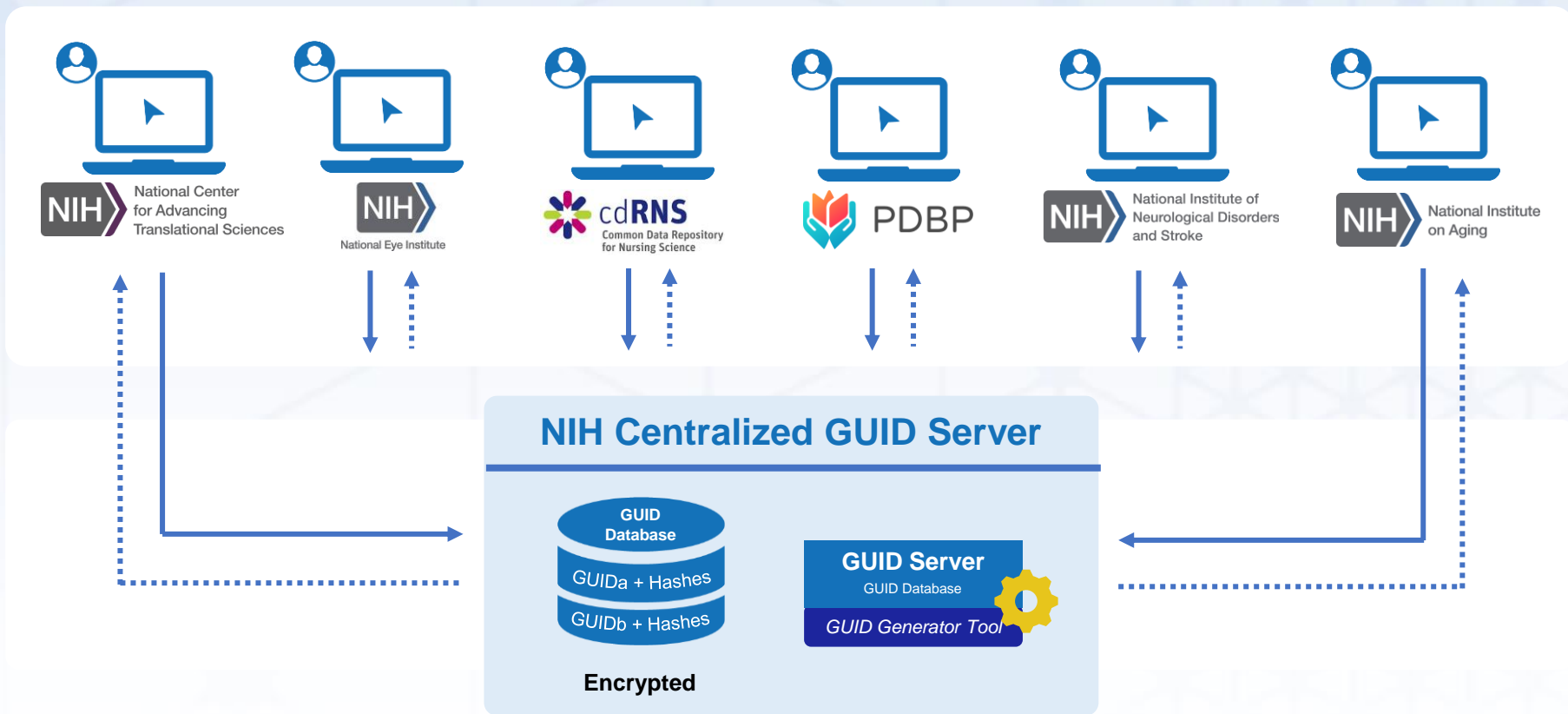


- ① Researcher logs into GUID client on their university PC and enters in subject PII
- ② GUID client (on university computer) uses personally identifiable information to derive a series of one-way hashes which securely encrypt PII information
- ③ One-way hashes are sent off to the GUID server for reference and storage. No personally identifiable information is sent to the system
- ④ GUID server returns a GUID identifier. If the one-way hashes match a known subject, an existing GUID will be returned. If this is a new subject, a new GUID will be returned.
- ⑤ Once the researcher has a GUID, s/he may submit data associated with this subject. No data may be submitted to the system without a GUID.
- ⑥ Once data is in the database, a researcher may query this data. The GUID allows researchers to distinguish between unique subjects and recurrent subjects across all datasets.
- ⑦ Researchers access data across studies, without revealing personally identifiable information, while correlating study data across different studies AND uniquely sorting between distinct and redundant datasets.





New Functionality Intramural Centralized PPRL





Required Fields	Please Enter Subject's Information (PII)	Please Confirm (Re-Enter) the Subject's Information
1. Complete legal given (first) name of the subject at birth	<input type="text"/>	<input type="text"/>
2. Does the subject have a middle name?	No <input type="button" value="v"/>	No <input type="button" value="v"/>
3. Complete additional (middle) name or names at birth	<input type="text"/>	<input type="text"/>
4. Complete legal family (last) name of subject at birth	<input type="text"/>	<input type="text"/>
5. Day of birth [1-31]	<input type="text"/>	<input type="text"/>
6. Month of Birth	<input type="button" value="v"/>	<input type="button" value="v"/>
7. Year of Birth [####]	<input type="text"/>	<input type="text"/>
8. Name of city/municipality in which subject was born	Do not use abbreviations (e.g. Saint Louis not St Louis)	Do not use abbreviations (e.g. Saint Louis not St Louis)
9. Country of Birth	<input type="button" value="v"/>	<input type="button" value="v"/>
Optional Fields		
10. Physical sex of subject at birth [M/F]	<input type="button" value="v"/>	<input type="button" value="v"/>
11. Government Issued or National ID	<input type="text"/>	<input type="text"/>
12. Country Issuing Government-Issued or National ID	<input type="button" value="v"/>	<input type="button" value="v"/>

GUID

Global Unique Identifier Tool

- The GUID tool has 9 required fields
- There are 3 optional fields
- Each field is entered twice for verification

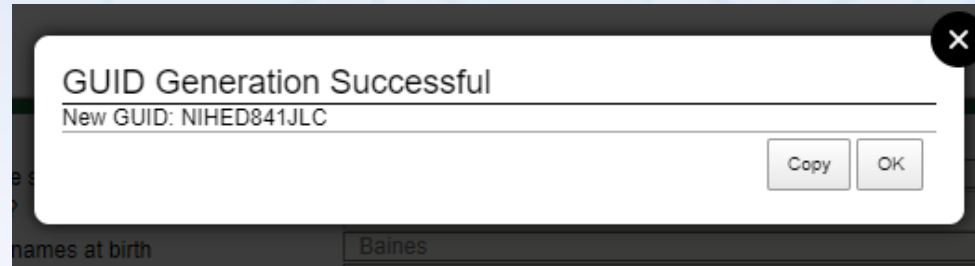


Required Fields	Please Enter Subject's Information (PII)	Please Confirm (Re-Enter) the Subject's Information
1. Complete legal given (first) name of the subject at birth	<input type="text" value="Lyndon"/>	<input type="text" value="Lyndon"/>
2. Does the subject have a middle name?	<input type="text" value="Yes"/>	<input type="text" value="Yes"/>
3. Complete additional (middle) name or names at birth	<input type="text" value="Baines"/>	<input type="text" value="Baines"/>
4. Complete legal family (last) name of subject at birth	<input type="text" value="Johnson"/>	<input type="text" value="Johnson"/>
5. Day of birth [1-31]	<input type="text" value="27"/>	<input type="text" value="27"/>
6. Month of Birth	<input type="text" value="August"/>	<input type="text" value="August"/>
7. Year of Birth [####]	<input type="text" value="1908"/>	<input type="text" value="1908"/>
8. Name of city/municipality in which subject was born	<input type="text" value="Stonewall"/>	<input type="text" value="Stonewall"/>
9. Country of Birth	<input type="text" value="UNITED STATES OF AMERICA (THE)"/>	<input type="text" value="UNITED STATES OF AMERICA (THE)"/>
Optional Fields		
10. Physical sex of subject at birth [M/F]	<input type="text"/>	<input type="text"/>
11. Government Issued or National ID	<input type="text"/>	<input type="text"/>
12. Country Issuing Government-Issued or National ID	<input type="text"/>	<input type="text"/>

GUID

Global Unique Identifier Tool

- The GUID tool has 9 required fields
- There are 3 optional fields
- Each field is entered twice for verification



Global Unique Identifier Tool

- The information entered is turned into one – way hash codes and is transmitted to the server application.
- The server checks against hash codes within the database.
- If there is a match, the existing GUID is returned.
- If there are no matches, a new GUID is created and sent to the client application.



BRICS

Biomedical Research
Informatics Computing System

Questions?



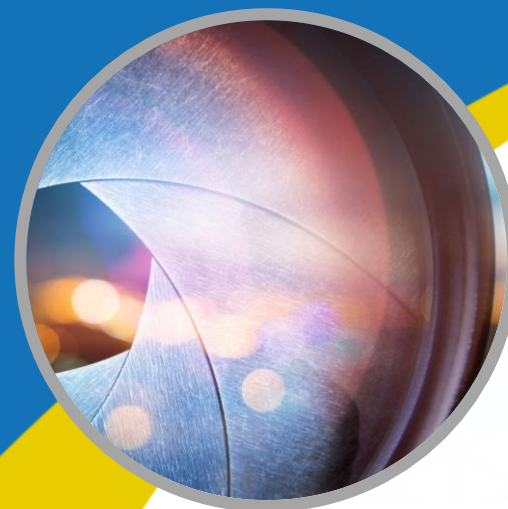


BRICS

Biomedical Research
Informatics Computing System

BRICS: Get to know the Data Repository

Michelle Harris



Data Repository

Data Repository

View Studies

View Studies lists the studies that the user has permissions to view. The provided filters will allow users to filter the View Studies table by Ownership, Data Submission Status, Data Types, and Study... >

Column Visibility Search:

#	TITLE	ORGANIZATION	STUDY ID	PI	DATA TYPES	# SUBJECTS	PERMISSION	FUNDING SOURCE(S)	SHARED DATA
1	Effect of Aerobic Exercise Training on Cardiorespiratory Function in Patients with TBI (CNRM)	National Institutes of Health Clinical Center	205	Chan, Leighton		12	Read	CNRM	Y
2	The Impact of Concussive and Sub-Concussive Blows on Brain Network Activity	University of Michigan	217	Broglio, Steven		98	Read	NIH-NINDS	Y
3	Phase 2 Pediatric Autologous BMMNC for Severe TBI		219	Cox, Charles		43	Read	NIH-NINDS	N
4	Soccer heading: potential for brain injury and opportunities for its mitigation	Albert Einstein College of Medicine	220	Lipton, Michael		355	Read	NIH-NINDS	Y
5	Quantitative MRI and 1H MRS in Traumatic Brain Injury	New York University School of Medicine	226	Lui, Yvonne		134	Read	NIH-NINDS	Y
6	CTE and Posttraumatic Neurodegeneration: Neuropathology and Ex Vivo Imaging (UNITE)	Boston University School of Medicine	227	McKee, Ann		804	Read	NIH-NINDS	N
7	Imaging and Biomarkers in Adolescents Cleared for Return to Play After Concussion	Baylor College of Medicine	228	Levin, Harvey		48	Read	NIH-NINDS	N
8	Addition of Pediatric TBI Data to FITBIR: Child Health After Injury (CHAI) study	University of Washington	230	Rivara, Frederick		927	Read	NIH-NINDS	Y
9	Approaches and Decisions in Acute Pediatric TBI Trial (ADAPT)	University of Pittsburgh	231	Wisniewski, Stephen		1000	Read	NIH-NINDS	Y
10	Advanced Imaging Acquisition and Data Analysis for a Military TBI Neuroimaging Database at NICoE	Walter Reed National Military Medical System	234	Ollinger, John		1543	Read	DoD-MRDC	N

- Central hub of the BRICS system
- Manage study information, and contribute, upload, and store the research data



Demo



BRICS

Biomedical Research
Informatics Computing System

Questions?



Data Submission Process

Michelle Harris





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 Files

ADAPTDemographics.csv

Choose Files

Load Files

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.

Color Legend: Requires Validation, Valid, Excluded, Error

Include Files

Exclude Files

Search:

<input checked="" type="checkbox"/>	NAME	TYPE	STRUCTURE	STATUS	RESULT	SUMMARY
<input checked="" type="checkbox"/>	ADAPTDemographics.csv	FORM STRUCTURE	ADAPTDemographics	Published	PASSED	29 Warnings

Showing 1 to 1 of 1 entries (1 row selected of 1)

Validate Files

Build Submission Package

Result Details

100 Warnings and Errors will be displayed.

Export Result Details

Disable Warnings

Search:

TYPE	DESCRIPTION
WARNING	ADAPTDemographics contains following Retired DE: BiologicalGenderTyp. Please contact ops for more information.
WARNING	The data entry at row 2, column 1, for the data element "Demographics reason" is empty. Data structure ADAPTDemographics identifies this element as RECOMMENDED.

- More universal implementation – From Java Webstart to JavaScript
- Validation at CDE level and Form level





Demo



BRICS

Biomedical Research
Informatics Computing System

Questions?





BRICS

Biomedical Research
Informatics Computing System

Closing Remarks

