



12

BRICS USER GUIDE

Data Mapping and Transformation (DMT)



CHAPTER 12 – Data Mapping and Transformation Tool

The Data Mapping and Transformation (DMT) tool, also known as Extract, Transform, Load (ETL) tool, is a web app that we access in the browser. The tool supports data definition, data mapping, data transformation, and data access through the research cycle. To ensure the quality of data being uploaded, the collected data must comply with the defined values and standardization found within the Data Dictionary.

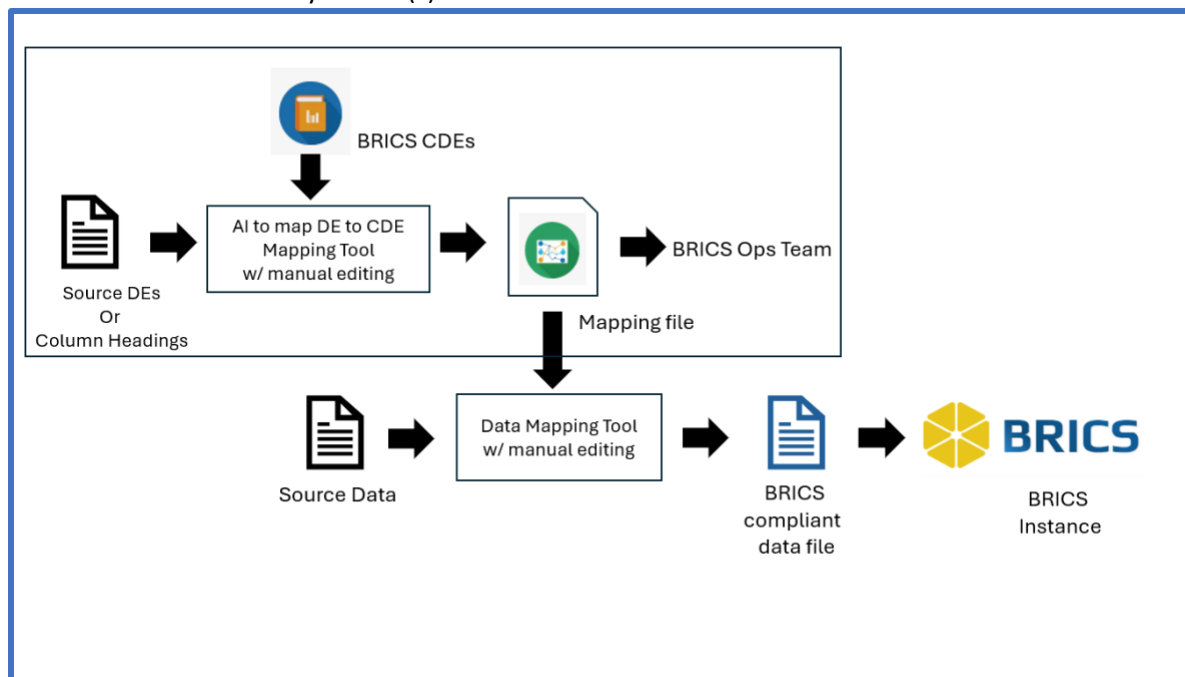
Using the DMT/ETL standard user-interface and analysis tools, researchers can easily load their Data Elements (DEs) and Permissible Values (PVs) in the form of a data dictionary to be paired with (or mapped to) eligible BRICS elements and their values within the BRICS Data Dictionary, thereby decreasing the time and effort required to input data to the BRICS system. After pairing or mapping, the DMT/ETL tool can accept the data (in the form of a CSV file) from a researcher and swaps their variable names and associated permissible values with variable names and values that are compliant with the BRICS Data Dictionary. The resulting file is now properly formatted for the validation tool, and if successfully validated, can be submitted with the submission tool.

The DMT/ETL tool comprises a set of tools that includes:

1. **Mapping Tool:** creates a map file that allow users to map their variables, variable datatypes, and permissible values (PVs) to the corresponding data elements and values from the BRICS Data Dictionary.
 - a. **AI Pairing:** Users can use an AI integration to automatically pair their data to the data elements in their desired form structure. The AI embedding model will semantically search the form structure's data elements for the most likely search.

Users can still manually change the paired elements if needed.
 - b. **Manual Pairing:** Users manually select their own data to map to its respective data element in the Form Structure.
2. **Transform Tool:** uses the map file to transform the user data file into BRICS format.

Figure 1: Data Mapping and Transformation (DMT) Tool – The DMT tool comprises mapping and transformation tools. The first step, mapping, involves manually mapping your source data dictionary to the data elements in a BRICS form structure. This mapping can be saved and reloaded for future reuse. The last step, transformation, involves applying the mapping file(s) to your source data file(s) for conversion to BRICS-ready csv file(s). Transformations can be saved and reloaded for future reuse.



12.1 System Requirements

Module Input:

- A form structure, to which data elements the source data should be mapped, it can obtain from the BRICS instance.
- A source data dictionary file (CSV) with data element definitions and permissible values (PVs).
- CSV files with clinical data, which are planned to map to the BRICS form structures and data elements.

Module Output:

- CSV files with clinical data transformed into BRICS format and ready for upload.
- The map file (TXT) which maps your data dictionary variables to BRICS variables. This map file should be saved and can be used and re-used for multiple data uploads.
- An error log with validation errors and warnings (if any).

12.1.1 Before using the DMT

Make sure that you have the following information ready:

1. The BRICS instance you are submitting data to.
2. Your data dictionary (even very rudimentary), which defines your variables for a given dataset, is formatted as required by the DMT tool. Refer to **example below** for more information.
3. The data file (CSV) your plan to map to BRICS FS/DEs is prepared and has the following information: the form structure short name is entered in the cell A1.

Name	Type	PVs	PV Description	Title
GUID	GUID			
NumbScale	Numeric	0;1;2;3	Not at all;Mildly;Moderately;Severe	BAI Numbness scale
FeelHotScale	Numeric	0;1;2;3	Not at all;Mildly;Moderately;Severe	BAI Feeling hot scale
WobblinessScale	Numeric	0;1;2;3	Not at all;Mildly;Moderately;Severe	BAI Wobbliness scale
UnableToRelaxScale	Numeric	0;1;2;3	Not at all;Mildly;Moderately;Severe	BAI Unable to relax scale
FearWorstScale	Numeric	0;1;2;3	Not at all;Mildly;Moderately;Severe	BAI Fear of the worst scale
DizzyScale	Numeric	0;1;2;3	Not at all;Mildly;Moderately;Severe	BAI Dizzy scale
HeartPoundScale	Numeric	0;1;2;3	Not at all;Mildly;Moderately;Severe	BAI Heart pounding/racing scale
UnsteadyScale	Numeric	0;1;2;3	Not at all;Mildly;Moderately;Severe	BAI Unsteady scale
TerrifiedScale	Numeric	0;1;2;3	Not at all;Mildly;Moderately;Severe	BAI Terrified or afraid scale
NervousScale	Numeric	0;1;2;3	Not at all;Mildly;Moderately;Severe	BAI Feeling nervous scale
ChokingScale	Numeric	0;1;2;3	Not at all;Mildly;Moderately;Severe	BAI Choking scale
HandsTremblingScale	Numeric	0;1;2;3	Not at all;Mildly;Moderately;Severe	BAI Hands trembling scale
ShakyScale	Numeric	0;1;2;3	Not at all;Mildly;Moderately;Severe	BAI Feeling shaky scale
FearLosingCtrlScale	Numeric	0;1;2;3	Not at all;Mildly;Moderately;Severe	BAI Fear of losing control scale
DifficultyBreathingScale	Numeric	0;1;2;3	Not at all;Mildly;Moderately;Severe	BAI Difficulty breathing scale
FearDyingScale	Numeric	0;1;2;3	Not at all;Mildly;Moderately;Severe	BAI Fear of dying scale
ScaredScale	Numeric	0;1;2;3	Not at all;Mildly;Moderately;Severe	BAI Feeling scared scale
IndigestionScale	Numeric	0;1;2;3	Not at all;Mildly;Moderately;Severe	BAI Indigestion scale
FaintScale	Numeric	0;1;2;3	Not at all;Mildly;Moderately;Severe	BAI Feeling faint/lightheaded scale
FaceFlushedScale	Numeric	0;1;2;3	Not at all;Mildly;Moderately;Severe	BAI Face flushed scale
HotColdSweatsScale	Numeric	0;1;2;3	Not at all;Mildly;Moderately;Severe	BAI Hot/cold sweats scale
BAITotalScore	Numeric			BAI Total Score
BAITotalScoreInterpretTy	Alphanumeric	Low anxiety;Moderate anxiety;Persistent and high anxiety		

12.1.2 Preparing the source data file

Before mapping your data onto BRICS variables, make sure that your data file is prepared. The preparation includes the following steps:

1. Make sure that the form structure short name is in A1 cell
2. Make sure you add the GUID column and GUIDs to all records.
3. Make sure that all variables which are included in your data file are also described in your data dictionary – the Source DE file.

A1 contains the PS short name

All the columns (variables) are represented and described in your data dictionary (Source DE file)

	A	B	C	D	E	F	G	H	I	J	K
1	BAI										
2	GUID	NumbSe	FeelHotSc	WobblinessSc	UnableToRelaxSc	FearWorstSc	DizzySc	HeartPoundSc	UnsteadySc	TerrifiedSc	NervousSc
3	INVND349VI	0	0	1	2	0	0	0	1	0	0
4	INVND349VI	0	0	0	0	0	0	0	1	0	0
5	INVND349VI	0	0	0	0	0	0	0	0	0	0
6	INVND349VI	0	0	0	0	0	0	0	0	0	0
7	INVND349VI	0	0	0	0	0	0	0	0	0	0
8	INVND349VI	0	0	0	0	0	1	0	0	0	0
9	INVND349VI	0	0	0	0	0	0	3	0	3	3
10	INVND349VI	0	0	0	0	0	0	0	0	0	0
11	INVND349VI	0	0	1	0	0	1	0	0	0	1
12	INVND349VI	0	0	0	0	0	0	0	0	0	0
13	INVND349VI	2	2	1	2	1	2	1	2	0	1

GUIDs are added to each row of data

	U	V	W	X	Y
	FaceFlushedSc	HotColdSweatsSc	BAITotalSc	BAITotalScore	InterpretType
	0	0	4		
	0	0	2		
	0	0	0		
	0	0	0		
	0	0	0		
	0	0	1		
	2	0	14		
	0	0	0		
	0	0	5		
	0	0	2		
	1	2	20		

12.2 Using the Data Mapping and Transformation (DMT) Tool

The DMT tool is available via the BRICS website. For steps downloading the CSV template, refer to the Data Dictionary module.

To launch the Data Mapping and Transformation tool

1. Navigate to [BRICS web site](#).
2. Find the Data Mapping And Transformation tool and launch it.

Data Mapping And Transformation (DMT)



The Data Mapping and Transformation (DMT) tool is an application used to translate data from users' systems, that may not have consistently used BRICS CDEs, to CDEs used in the BRICS system. In addition, the system translation tool saves the translated data into a BRICS compliant CSV that can then be processed by the Validation tool.

[Launch Mapping Tool](#)

3. Read and accept the privacy agreement.

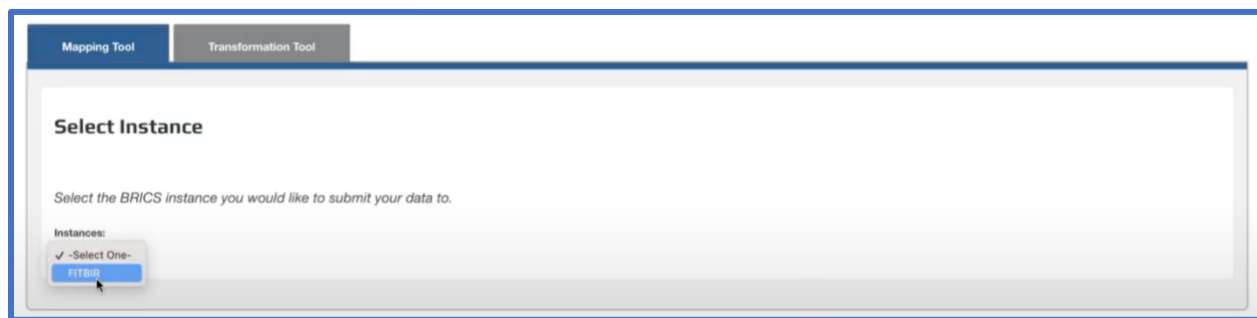
Data Privacy

This system is a collaborative environment with privacy rules that pertain to the collection and display of imaging data. Before accessing and using this systems, please ensure you familiarize yourself with our privacy rules available through the Access Request and supporting documentation.

Collection of this information is authorized under 42 U.S.C. 241, 242, 248, 281(a)(b)(1)(P) and 44 U.S.C. 3101. The primary use of this information is to facilitate medical research. This information may be disclosed to researchers for research purposes, and to system administrators for evaluation and data normalization.

Rules governing submission of this information are based on the data sharing rules defined in the Notice of Grant Award (NOGA). If you do not have a grant defining data sharing requirements, data submission is voluntary. Data entered into the system will be used solely for scientific and research purposes and is designed to further the understanding the disease. Modification of information may be addressed by contacting your system administrator at . Significant system update information may be posted on the site as required.

4. Select the instance you wish to submit your data to:



Mapping Tool | **Transformation Tool**

Select Instance

Select the BRICS instance you would like to submit your data to.

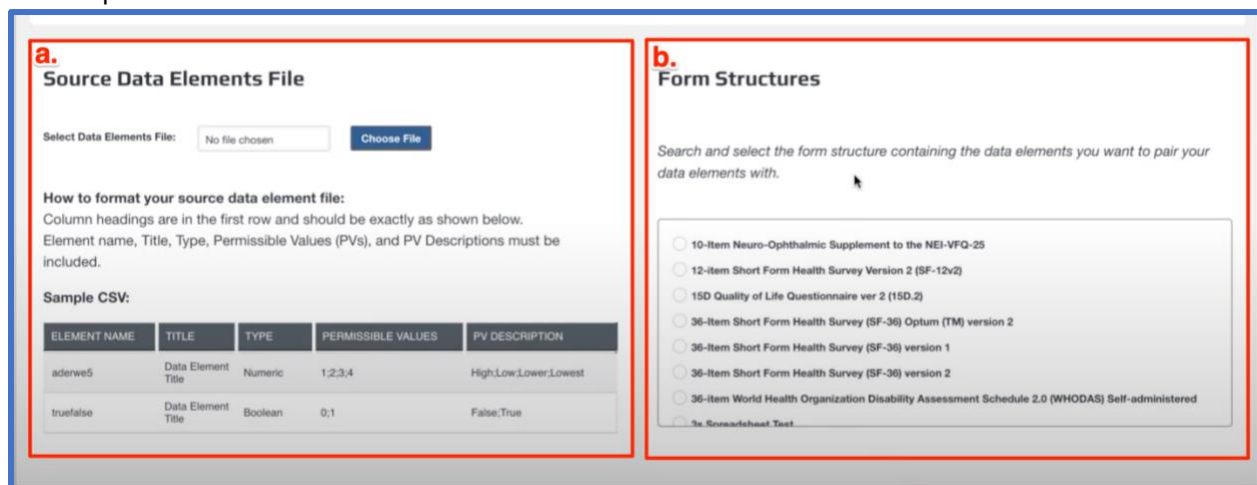
Instances:

✓ -Select One-
FITBIR

12.2.1 Using the data mapping tool

After selecting your instance two sections will be displayed.

- Source Data Elements File:** Where users will upload the file containing their data.
- Form Structures:** Where users will select the Form Structure that their data elements file pertains too.



a. Source Data Elements File

Select Data Elements File: **Choose File**

How to format your source data element file:
Column headings are in the first row and should be exactly as shown below. Element name, Title, Type, Permissible Values (PVs), and PV Descriptions must be included.

Sample CSV:

ELEMENT NAME	TITLE	TYPE	PERMISSIBLE VALUES	PV DESCRIPTION
aderwe5	Data Element Title	Numeric	1;2;3;4	High;Low;Lower;Lowest
truefalse	Data Element Title	Boolean	0;1	False;True

b. Form Structures

Search and select the form structure containing the data elements you want to pair your data elements with.

- ☐ 10-Item Neuro-Ophthalmic Supplement to the NEI-VFQ-25
- ☐ 12-item Short Form Health Survey Version 2 (SF-12v2)
- ☐ 15D Quality of Life Questionnaire ver 2 (15D.2)
- ☐ 36-Item Short Form Health Survey (SF-36) Optum (TM) version 2
- ☐ 36-Item Short Form Health Survey (SF-36) version 1
- ☐ 36-Item Short Form Health Survey (SF-36) version 2
- ☐ 36-Item World Health Organization Disability Assessment Schedule 2.0 (WHODAS) Self-administered
- ☐ 3a. Researchsheet Test

Follow these steps to generate a mapping file:

- Upload the data elements file containing your data.
- Search and select the relevant Form Structure.
- Two ways to pair your data to the form structure's data elements:
 - AI pairing:** Where the user allows AI to automatically map to their data elements.
 - Select source data element(s) and click the **"Pair with AI"** button.
 - Manually pairing:** Where the user will manually select the data element their data corresponds too.
 - Select source data element and then select the form structure data element and click the **"Manually Pair Data Elements"** button.

Source Data Elements

Search:

<input type="checkbox"/>	ELEMENT NAME	TITLE	DESCRIPTION	TYPE
<input type="checkbox"/>	bdiagitationscale1	This is a test	a,b,c,d	Numeric
<input type="checkbox"/>	bdiappettescale1	This is a test	a,b,c,d	Numeric
<input checked="" type="checkbox"/>	bdiiconcentrationscale1	This is a test	a,b,c,d	Numeric
<input type="checkbox"/>	bdiicryingscale1	How many concussions have you had before this injury	a,b,c,d	Numeric
<input type="checkbox"/>	bdiiguiltfeelingsscale1	This is a test	a,b,c,d	Numeric

a. AI Pairing **b. Manual pairing**

Form Structure Data Elements

Search:

<input type="radio"/>	ELEMENT NAME	TITLE	DESCRIPTION	TYPE	REQUIRED?
<input type="radio"/>	ACECognitiveSymptomScore	Acute Concussion Evaluation - Cognitive symptom type, as part of the ACE	Cognitive symptom type, as part of the ACE	Numeric Values	Recommended
<input type="radio"/>	ACECognitiveSymptomType	Acute Concussion Evaluation - Cognitive Symptom Type	Type of cognitive symptom, as part of the ACE	Alphanumeric	Recommended

4. After pairing data element(s), the paired element(s) will have a highlighted color to indicate they have been paired. Continue pairing the other data elements as you need.

Source Data Elements

Search:

<input type="checkbox"/>	ELEMENT NAME	TITLE	DESCRIPTION	TYPE
<input type="checkbox"/>	bdiappettescale1	This is a test	a,b,c,d	Numeric
<input type="checkbox"/>	bdiiconcentrationscale1	This is a test	a,b,c,d	Numeric
<input type="checkbox"/>	bdiicryingscale1	This is a test	a,b,c,d	Numeric
<input checked="" type="checkbox"/>	bdiiguiltfeelingsscale1	This is a test	a,b,c,d	Numeric
<input checked="" type="checkbox"/>	bdiindecisivenessscale1	This is a test	a,b,c,d	Numeric
<input type="checkbox"/>	bdiirritabilityscale1	This is a test	a,b,c,d	Numeric

These elements have been paired

Form Structure Data Elements

A red asterisk (*) indicates a required data element.

Search:

<input type="radio"/>	ELEMENT NAME	TITLE	DESCRIPTION	TYPE
<input checked="" type="radio"/>	GUID *	GUID	Global Unique ID which uniquely identifies a subject	GUID
<input type="radio"/>	AgeYrs	Age in years	Value for participant's subject age recorded in years.	Numeric Values
<input type="radio"/>	VisitDate	Visit date	Actual interview or visit date	Date or Date & Time

5. If you scroll down, you will be able to see the list of paired data. Here you can select the paired elements and remove a pair if it is not correctly matched.

Paired Data Elements

Search:

<input type="checkbox"/>	SOURCE ELEMENT NAME	SOURCE PV	SOURCE PV DESCRIPTION	FORM ELEMENT NAME	FORM PV	FORM PV DESCRIPTION	MAPPING
<input type="radio"/>	bdiiconcentrationscale1	0,1,2,3	a,b,c,d	ACECognitiveSymptomScore			
<input type="radio"/>	bdiicryingscale1	0,1,2,3	a,b,c,d	ConcussionPriorNum			
<input type="radio"/>	participantid			GUID			

6. If the paired data element has **permissible values (PVs)** then we can map them by:
- Clicking **"Map PVs"** in the mapping column:

Paired Data Elements

Search:

	SOURCE ELEMENT NAME	SOURCE PV	SOURCE PV DESCRIPTION	FORM ELEMENT NAME	FORM PV	FORM PV DESCRIPTION	MAPPING
<input type="radio"/>	bdliconcentrationscale1	0,1,2,3	a.b.c.d	ACECognitiveSymptomScore			
<input type="radio"/>	bdlicoryngscale1	0,1,2,3	a.b.c.d	ConcussionProfform			
<input type="radio"/>	bdlicgultyfeelingscale1	0,1,2,3	a.b.c.d	ACECognitiveSymptomTyp		Difficulty concentrating Difficulty remembering Feels mentally foggy Feels slowed down	Map PVs

b. Selecting the values that correspond to the data elements permissible values.

Map Permissible Values

Use the dropdowns below to map your Source Permissible Values (PVs) to the Form Structure PVs.

Source PVs	Form Structure PVs
0	Feels mentally foggy
1	Difficulty concentrating
2	Difficulty concentrating
3	Difficulty concentrating

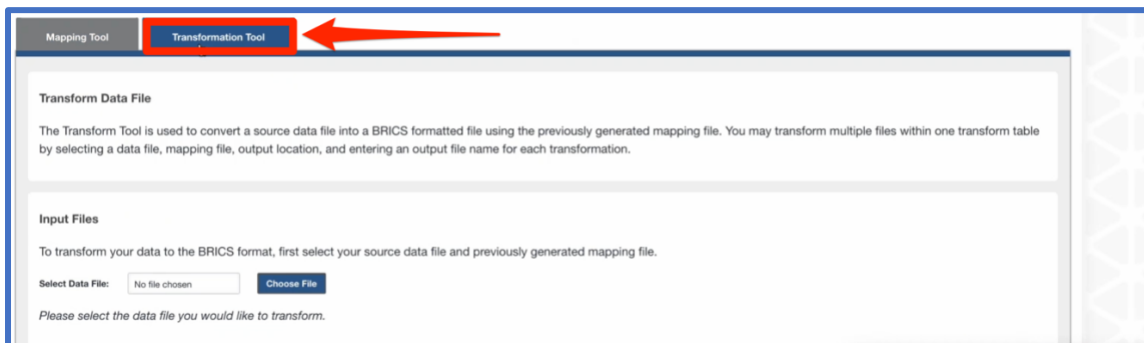
- After all the desired data elements have been matched and permissible values have been paired you can generate the mapping file by scrolling down and selecting the **"Generate Mapping File"** button and a file will download to your computer.

Generate Mapping File

Please make sure to map all required form structure data elements in order to generate a mapping file. This file can be used in the Transformation Tool tab.

12.2.2 Using the transformation tool

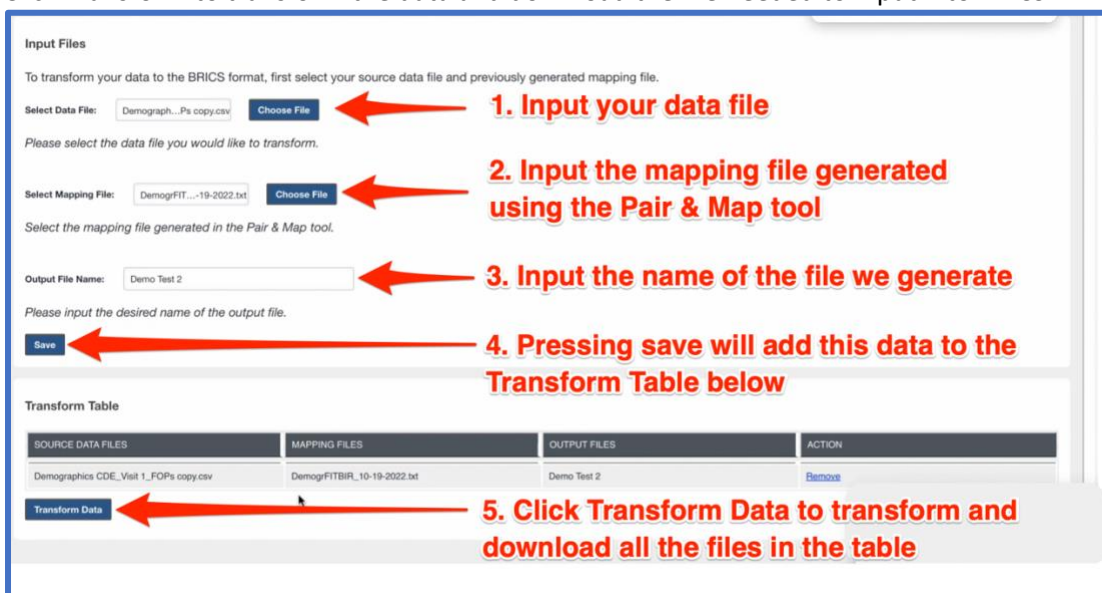
1. Click on the Transformation Tool



2. Input the required fields:

- **Data File:** The file that contains the data we wish to be added to BRICS
- **Mapping File:** The file that was generated using the Mapping Tool
- **Output File Name:** The name of the file we want our transformed data to be.

3. Click Save to add the data to the **Transform Table**.
4. Click Transform to transform the data and download the file needed to input into BRICS.



Input Files

To transform your data to the BRICS format, first select your source data file and previously generated mapping file.

Select Data File: Demograph...Ps copy.csv **Choose File**

Please select the data file you would like to transform.

Select Mapping File: DemogrFIT...19-2022.txt **Choose File**

Select the mapping file generated in the Pair & Map tool.

Output File Name: Demo Test 2

Please input the desired name of the output file.

Save

Transform Table

SOURCE DATA FILES	MAPPING FILES	OUTPUT FILES	ACTION
Demographics CDE_Visit 1_FOPs copy.csv	DemogrFITBIRL_10-19-2022.txt	Demo Test 2	Remove

Transform Data