

Welcome to REASSURe documentation

Developed by LSHTM with support from UNICEF, it streamlines the management and analysis of SMART Surveys. SMART surveys are essential for evaluating nutritional status and mortality. Typically, these surveys are analyzed using the ENA software, which handles only one survey at a time. For projects requiring the analysis of hundreds of SMART surveys at different administrative levels, this tool has been developed to optimize the process. It applies the results of the ENA to several surveys simultaneously and includes additional functionality to improve analysis and management.

This document will explain how you can run the app to obtain the results you expect.

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Step 1: Access to R and RStudio

Both R and RStudio must be installed on your computer before moving on to Step 2.

If you already have RStudio on your computer, you can proceed directly to Step 2. If not, follow the instructions provided on this webpage: <https://posit.co/download/rstudio-desktop/>, or you can watch this YouTube video tutorial for a step-by-step guide:

<https://www.youtube.com/watch?v=H9EBIFDGG4k>.

Step 1.1: Download R:

1. Copy and paste this link into your web browser: <https://posit.co/download/rstudio-desktop/>.
2. Follow the steps shown in Figures 1 to 5 to complete the installation.

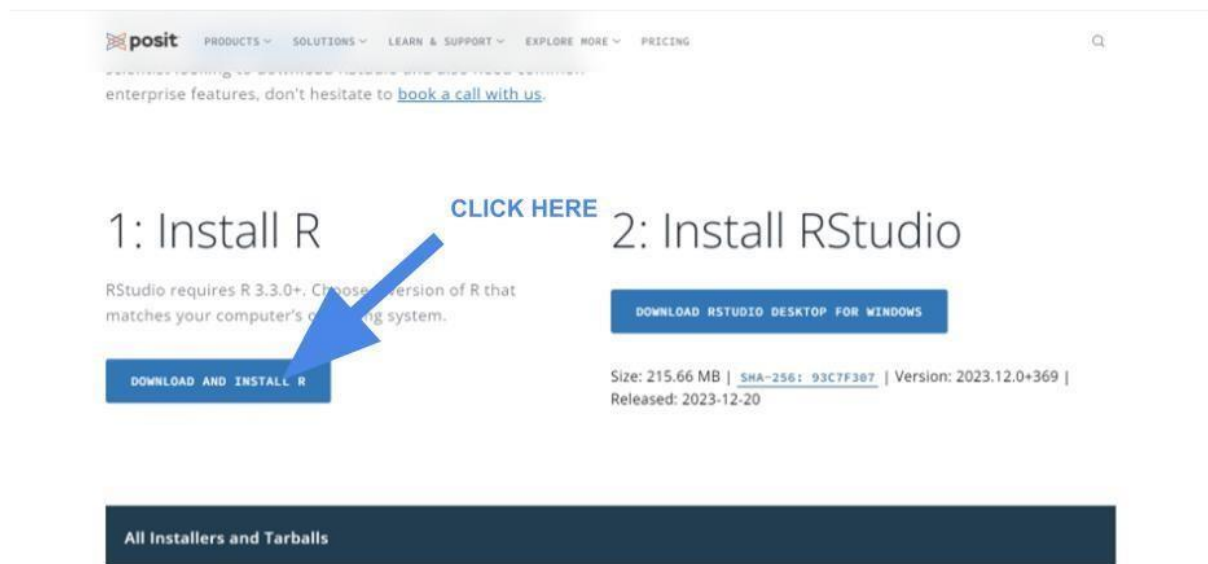


Figure 1: This screenshot shows the homepage where you can download RStudio.

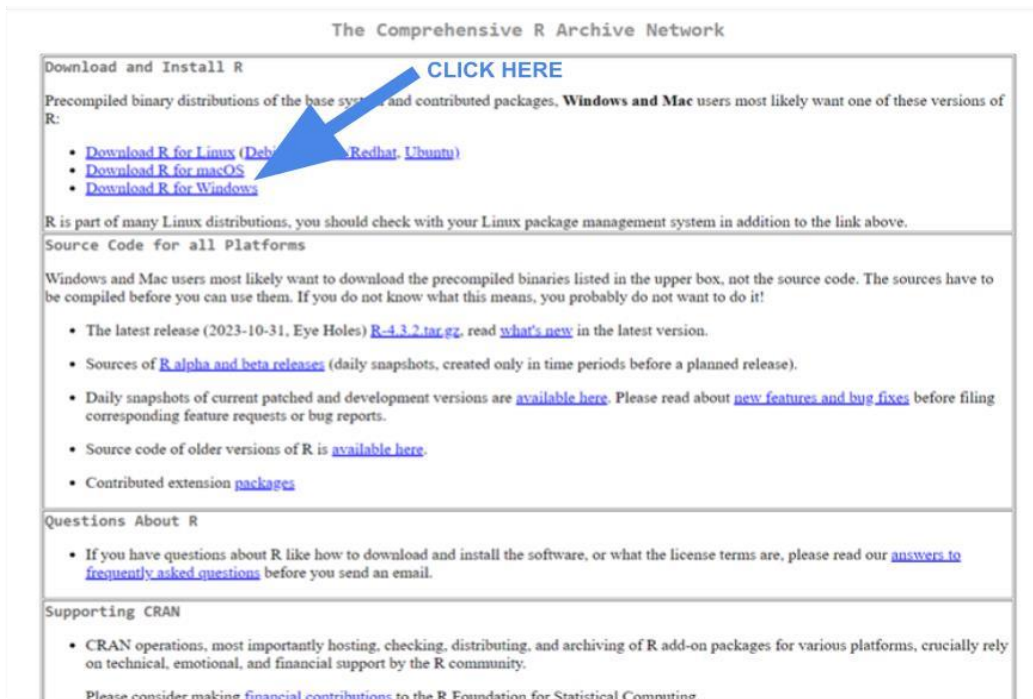


Figure 2: After accessing the website, navigate to the section for downloading R

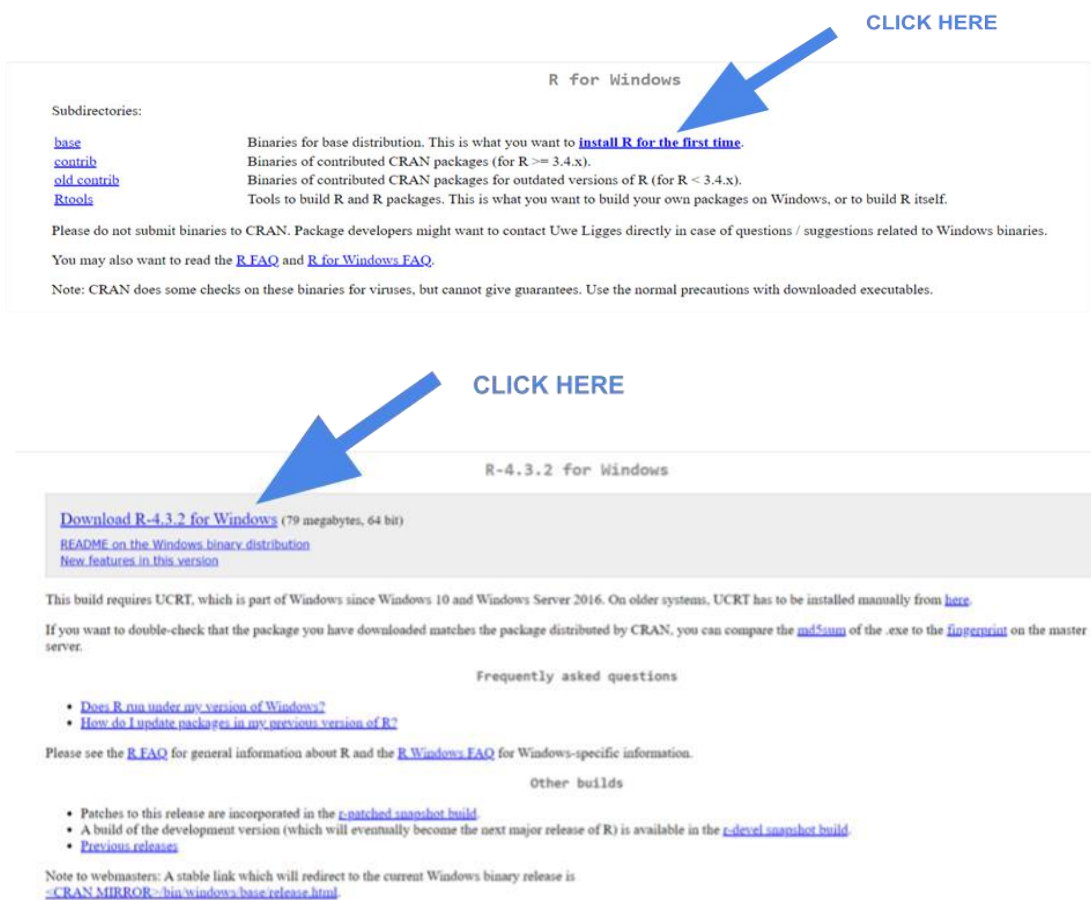


Figure 3. Continue following the instructions to select the appropriate version for your operating system.

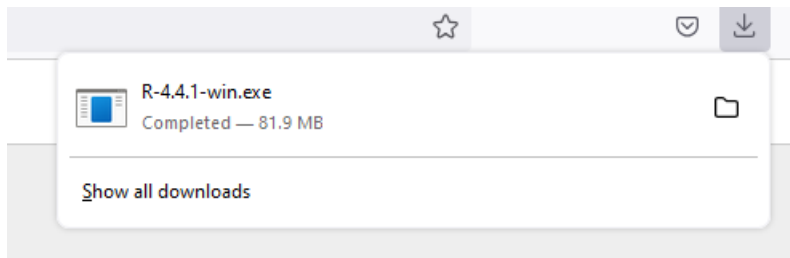


Figure 4: Once the .exe file is downloaded, double-click on it to start the installation process.

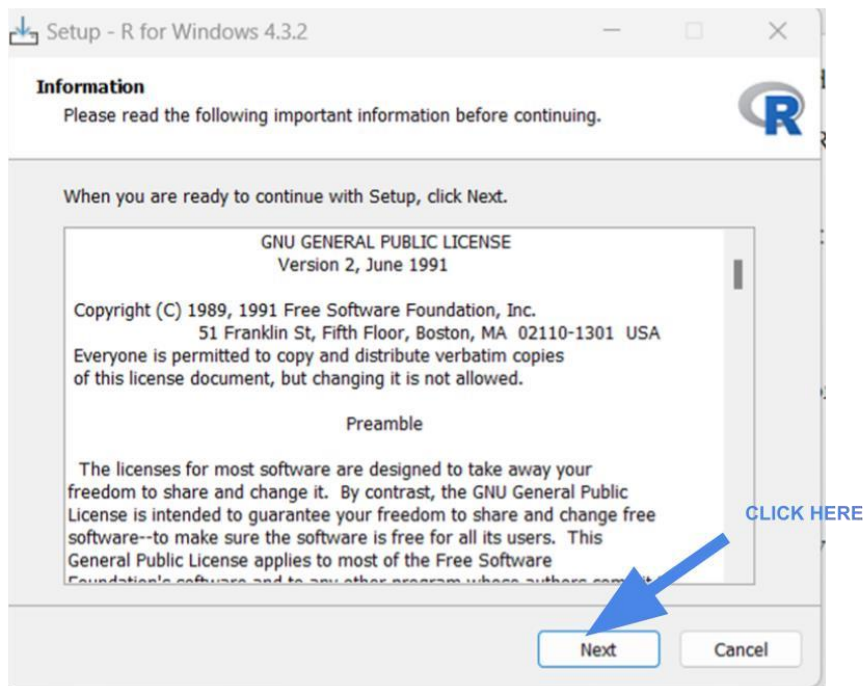


Figure 5: Click "Next" through the installation prompts until the installation is complete.

Step 1.2: Download RStudio:

1. Copy and paste this link into your web browser: <https://posit.co/download/rstudio-desktop/>.
2. Follow the steps shown in Figures 6 and 7 to complete the download.

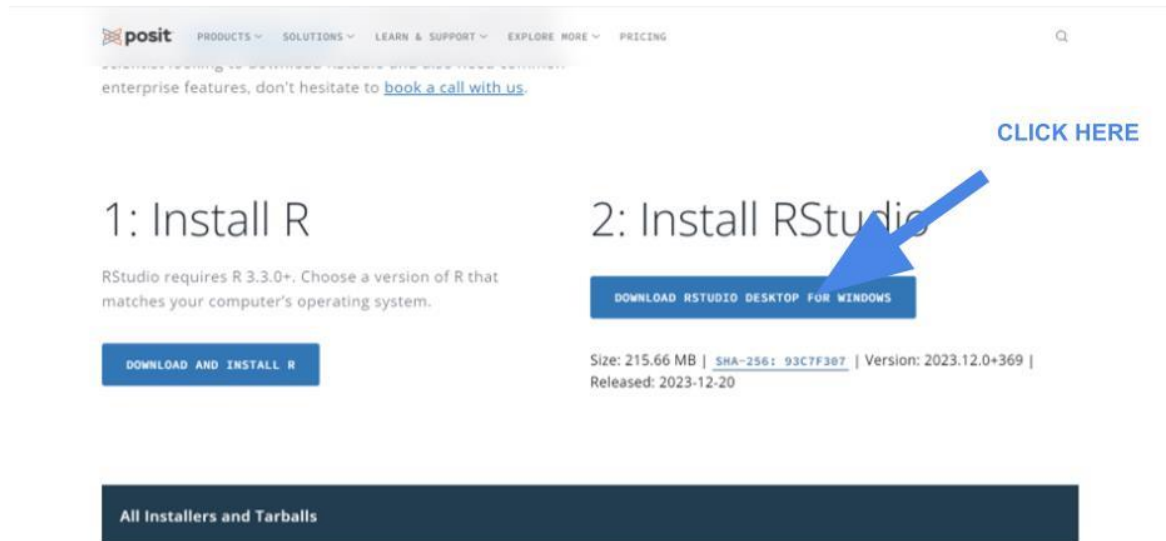


Figure 6: This screenshot shows the download page for RStudio, similar to the R page.



Figure 7: Once the file is downloaded, you will see this screen. Double-click to install.

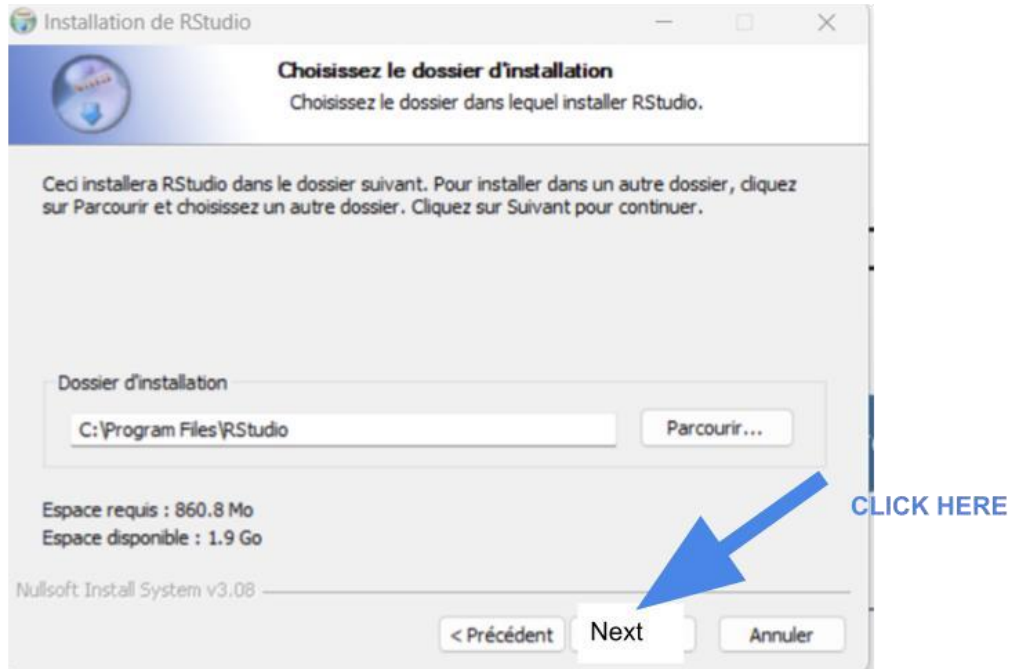


Figure 8: Click "Next" through the installation prompts until the installation is complete.

Step 2: Download REASSURE

Now that you have R and RShiny installed, you are ready to download the REASSURE app.

1. Copy and paste the following link into your web browser:

https://github.com/yamnao/reassure_app

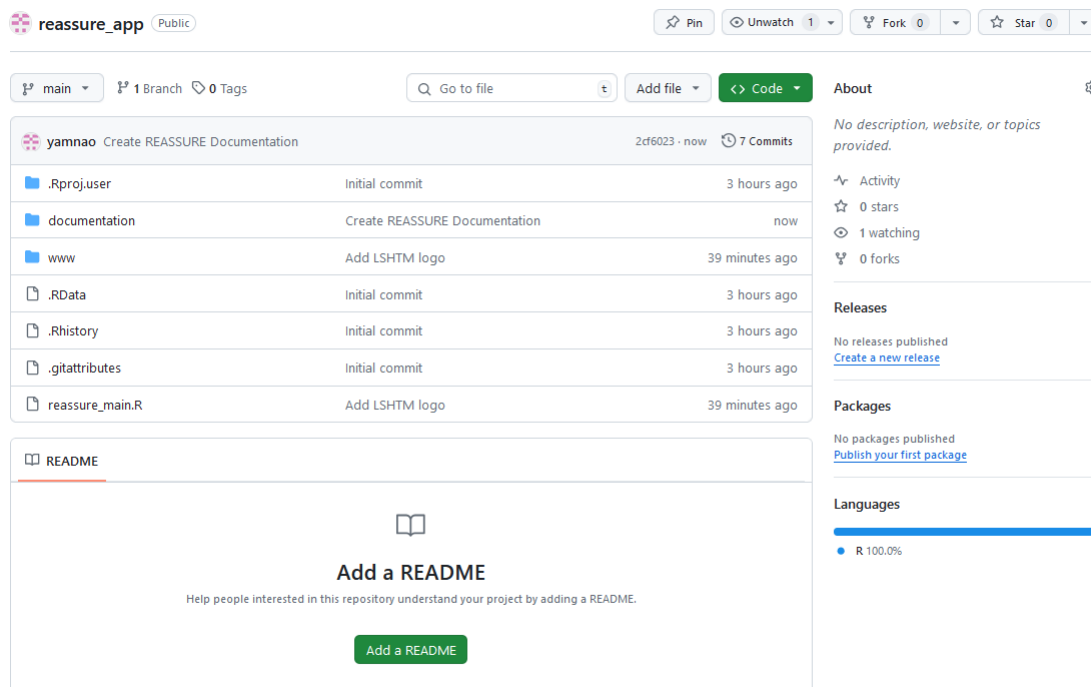
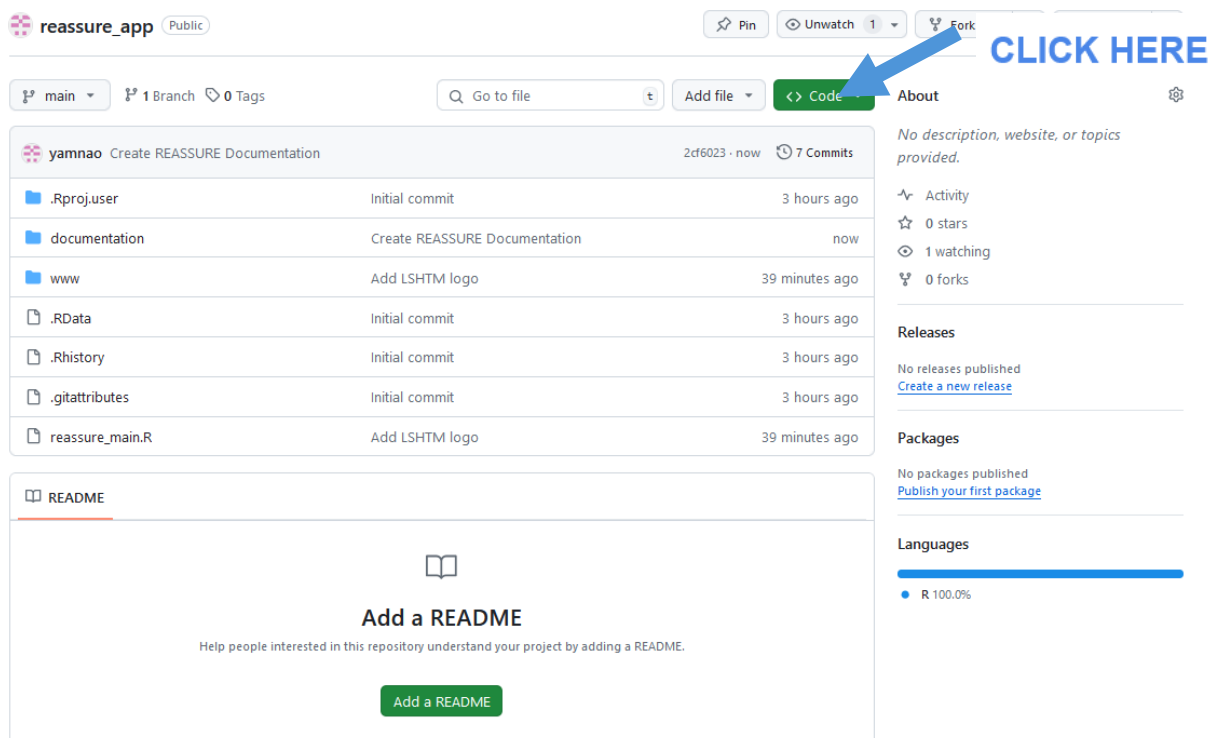


Figure 8: Github webpage containing the REASSURE app.

2. To download the App, please click on the “Code” button and then on “Download ZIP”.



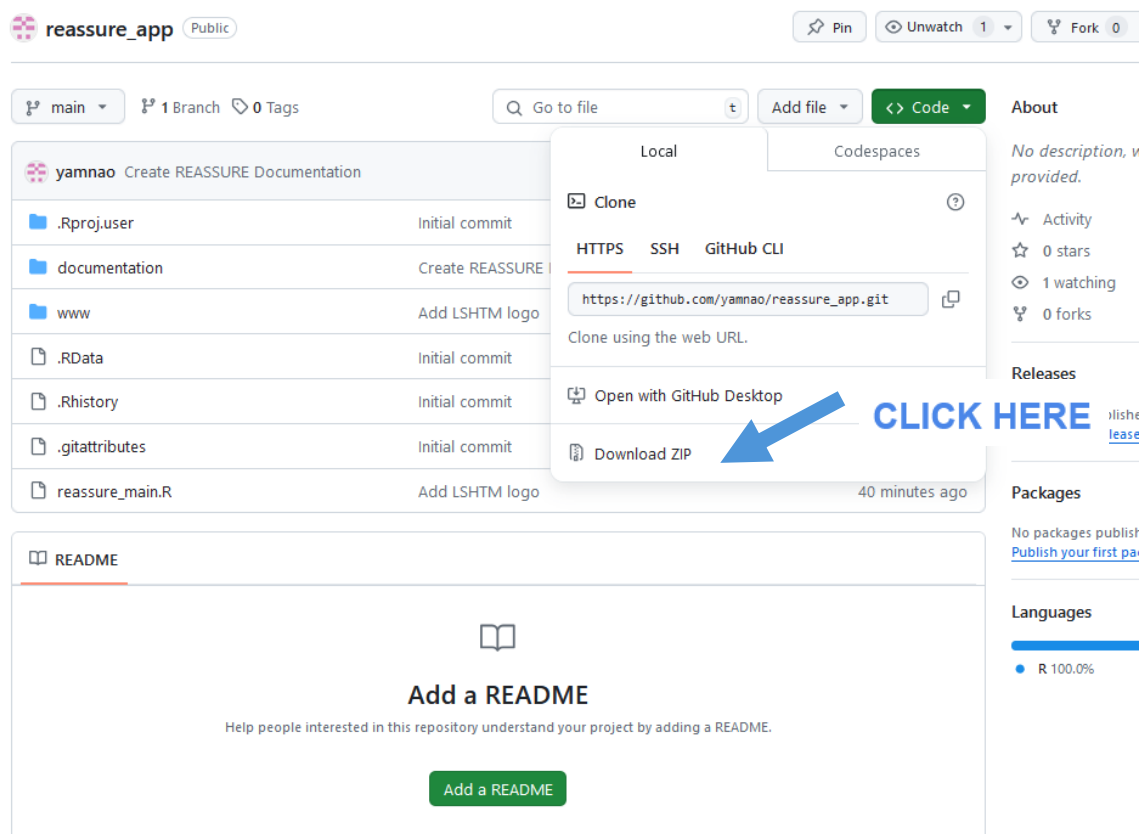


Figure 9: Download the ZIP file containing the REASSURE code.

3. Unzip the folder by extracting it.

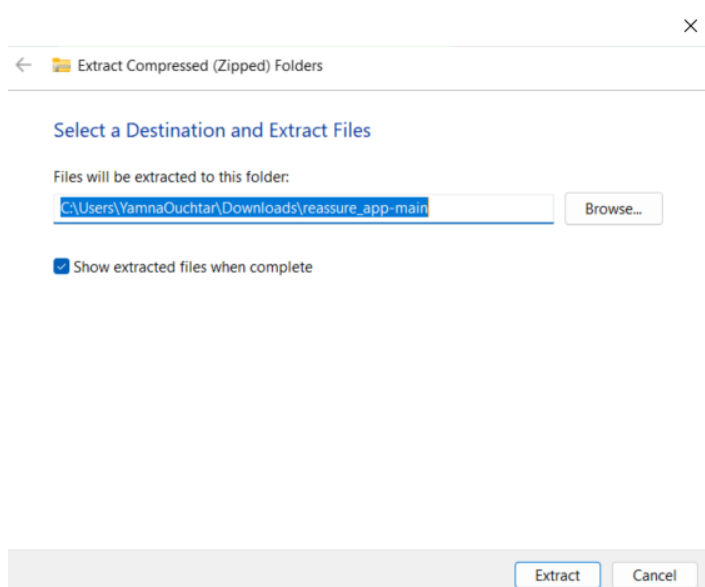


Figure 10: Unzip the file.

- After unzipping the folder, locate the `reassure_main` file. Right-click on it, and select "Open with RStudio"

.Rproj.user		20/05/2024 13:39	File folder	
documentation		22/08/2024 14:11	File folder	
www		22/08/2024 13:22	File folder	
.gitattributes		22/08/2024 10:55	GITATTRIBUTES File	1 KB
.RData		12/07/2024 16:53	R Workspace	3 KB
.Rhistory		09/08/2024 14:54	RHISTORY File	3 KB
reassure_main		22/08/2024 13:23	R File	33 KB

Figure 11: Open the `reassure_main` code using Rstudio.

- The following window will appear.

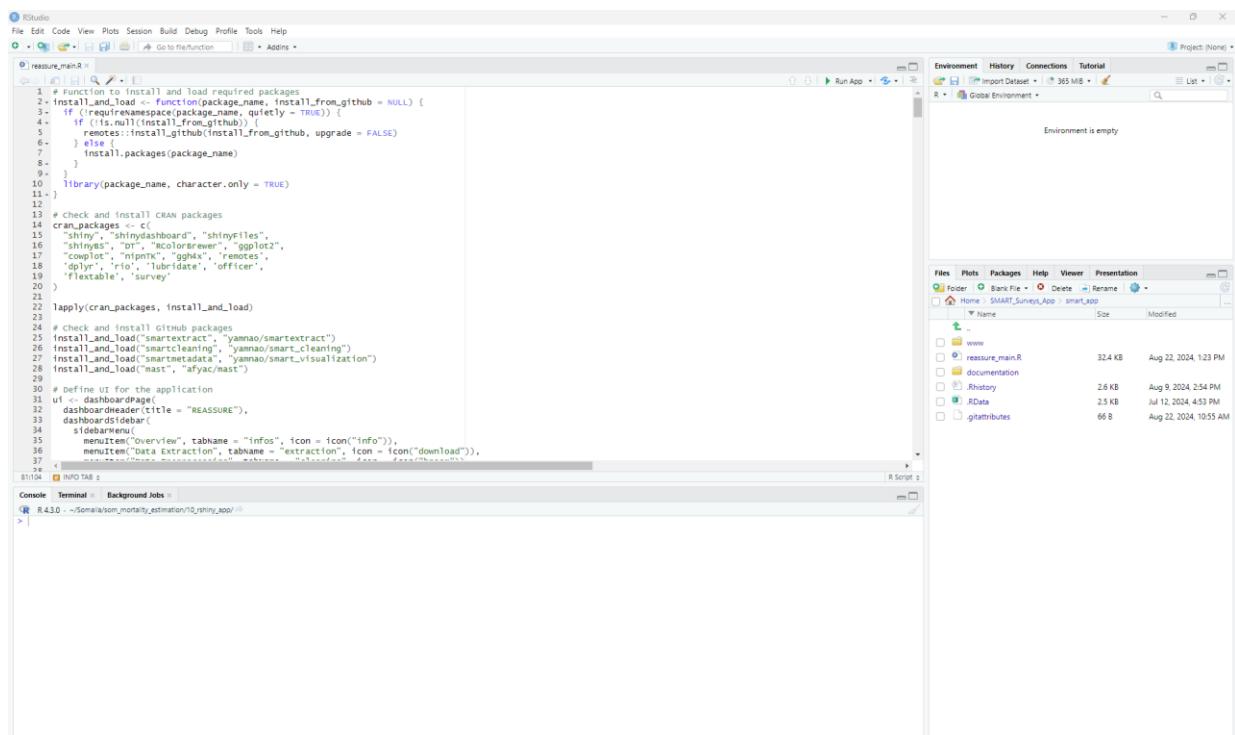


Figure 12: Overview of the REASSURE code.

Step 3: Run the App Locally

1. In RStudio, click on the “Run App” button.

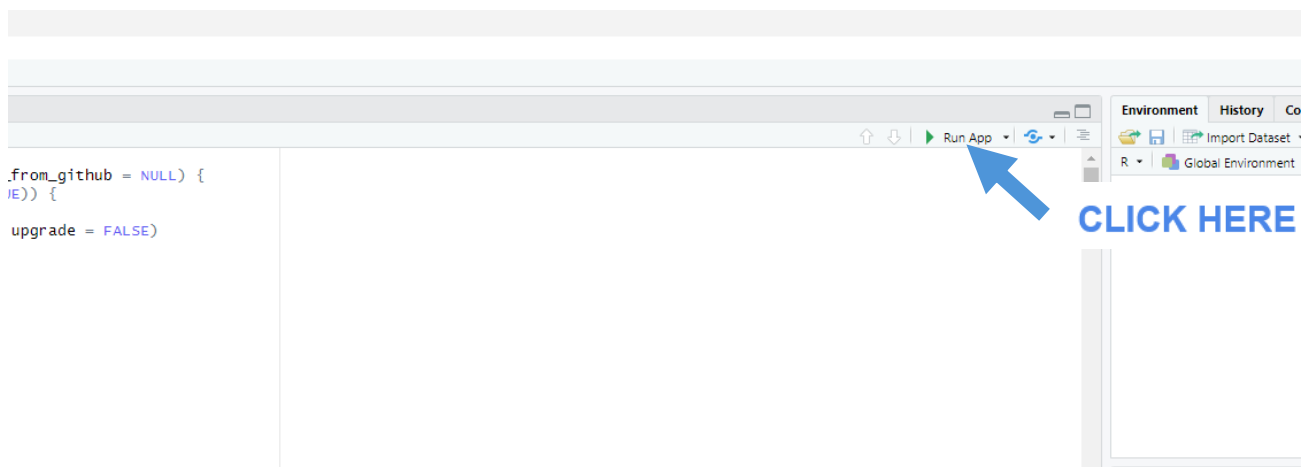


Figure 13: Click on the Run App button to run the REASSURE app from the Rstudio code.

2. REASSURE App will appear.

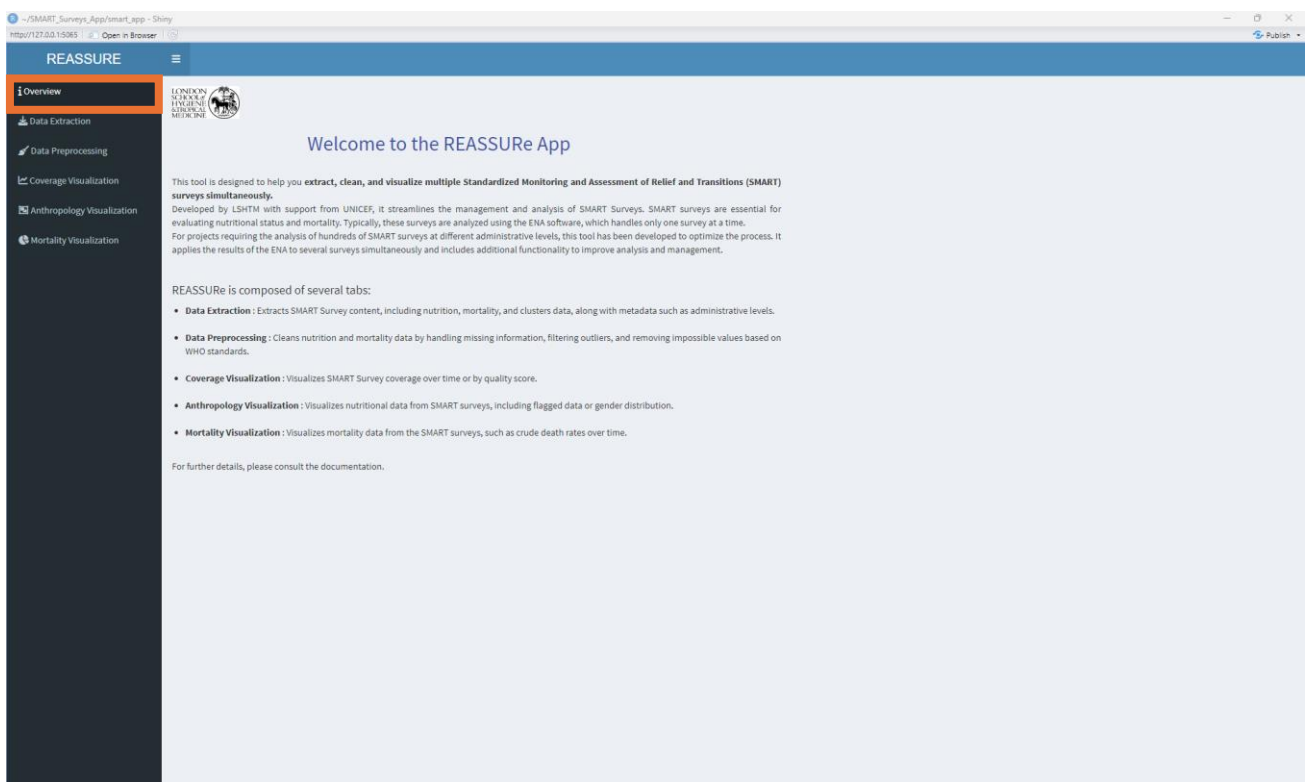


Figure 14: Overview of the REASSURE App.

Step 4: Understanding the different tabs

Tab 1: Extract SMART Survey Content

1. Click on the **Data Extraction** tab

The screenshot shows the REASSURE web application interface. On the left is a dark sidebar with a menu containing 'Overview', 'Data Extraction' (highlighted with an orange border), 'Data Preprocessing', 'Coverage Visualization', 'Anthropology Visualization', and 'Mortality Visualization'. The main content area has a blue header with the title 'Extract SMART Survey Content'. Below the header, there is explanatory text about how REASSURE organizes SMART surveys. A 'Parameters' section lists three steps: 1. Country selection (with options: KEN, SOM, No Specified Country, and Add a Country), 2. Folder containing SMART Surveys, and 3. Folder to save the results. Each step has a corresponding input field with a dropdown arrow and a blue circular icon with a plus sign. At the bottom of the form is an orange 'Start Extraction' button.

REASSURE

Overview

Data Extraction

Data Preprocessing

Coverage Visualization

Anthropology Visualization

Mortality Visualization

Extract SMART Survey Content

REASSURE organizes the SMART surveys and extracts their contents (clusters, nutrition, and mortality data) into a specified output folder. Each SMART survey will have its own folder containing four files: nutrition, mortality, cluster, and the raw SMART file. In addition, a metadata Excel file will be generated, listing the name, location, and date of each SMART survey.

Parameters:

1. **Country:** Select the country where the SMART surveys were conducted.
 - **KEN:** For Kenya
 - **SOM:** For Somalia
 - **No Specified Country:** If the location is irrelevant or surveys were conducted in multiple countries.
 - **Add a Country:** Users can upload the other country's administrative level file. Refer to the documentation for file content details.
2. **Folder containing SMART Surveys:** Select the folder containing the .as files.
3. **Folder to save the results:** Select the folder to save the extracted content.

Select SMART localisation:

Select the folder containing SMART Surveys:

Select folder to save the results:

Start Extraction

Figure 15: Overview of the Data Extraction tab.

2. Select the localization of the SMART survey you want to extract:
 - **KEN** option: If the SMART survey was conducted in Kenya, select this option to filter and manage the data specific to Kenya.
 - **SOM** option: If the SMART survey was conducted in Somalia, select this option to focus on Somalia-specific data.
 - **No Specified Country** option: If you prefer not to specify a country, select this option. This can be useful for managing data that spans multiple regions or when country-specific analysis is not necessary.
 - **Add a Country** option: if the survey was conducted in a country other than Kenya or Somalia, or if you need to include additional countries in your analysis, select this option to add the relevant country. In this case, you will need to add administrative level data with the expected format. The country data should be an Excel file with 3 different columns: eventual_name, right_name, and level. The last column could contain levels such as admin1, admin2, or lhz.

REASSURE

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Extract SMART Survey Content

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Parameters:

- Country:** Select the country where the SMART surveys were conducted.
 - KEN:** For Kenya
 - SOM:** For Somalia
 - No Specified Country:** If the location is irrelevant or surveys were conducted in multiple countries.
 - Add a Country:** Users can upload the other country's administrative level file. Refer to the documentation for file content details.
- Folder containing SMART Surveys:** Select the folder containing the .as files.
- Folder to save the results:** Select the folder to save the extracted content.

Select SMART localisation:

No Specified Country

KEN

SOM

Add a country

Select folder to save SMART Surveys content

Start Extraction

Figure 16: Select the localisation of the SMART surveys.

Select SMART localisation:

Add a country

Enter the three first letter of the new country:

Upload a file with country data:

Browse... No file selected

Below is an overview of the expected file format:

	eventual_name	right_name	level
1	coastal	coastal	lhz
2	BOSSASO	Bossaso	admin2
3	BRAVA	Baraawe	admin2
4	BUAALE	Bu'aale	admin2
5	BUHODLE	Buuhoodle	admin2

Select the folder containing SMART Surveys:

Select folder containing .as files (SMART Surveys)

Figure 17. Add an excel file containing the localisation area of the country where the SMART surveys have been conducted if you have selected the **Add Country** option.

3. Select the folder containing the SMART Surveys i.e. the .as files.

REASSURE

Extract SMART Survey Content

REASSURE organizes the SMART surveys and extracts their contents (clusters, nutrition, and mortality data) into a specified output folder. Each SMART survey will have its own folder containing four files: nutrition, mortality, cluster, and the raw SMART file. In addition, a metadata Excel file will be generated, listing the name, location, and date of each SMART survey.

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 - KEN:** For Kenya
 - SOM:** For Somalia
 - No Specified Country:** If the location is irrelevant or surveys were conducted in multiple countries.
 - Add a Country:** Users can upload the other country's administrative level file. Refer to the documentation for file content details.
- Folder containing SMART Surveys:** Select the folder containing the .as files.
- Folder to save the results:** Select the folder to save the extracted content.

Select SMART localisation:

Select the folder containing SMART Surveys:

Select folder to save the results:

CLICK HERE

Start Extraction

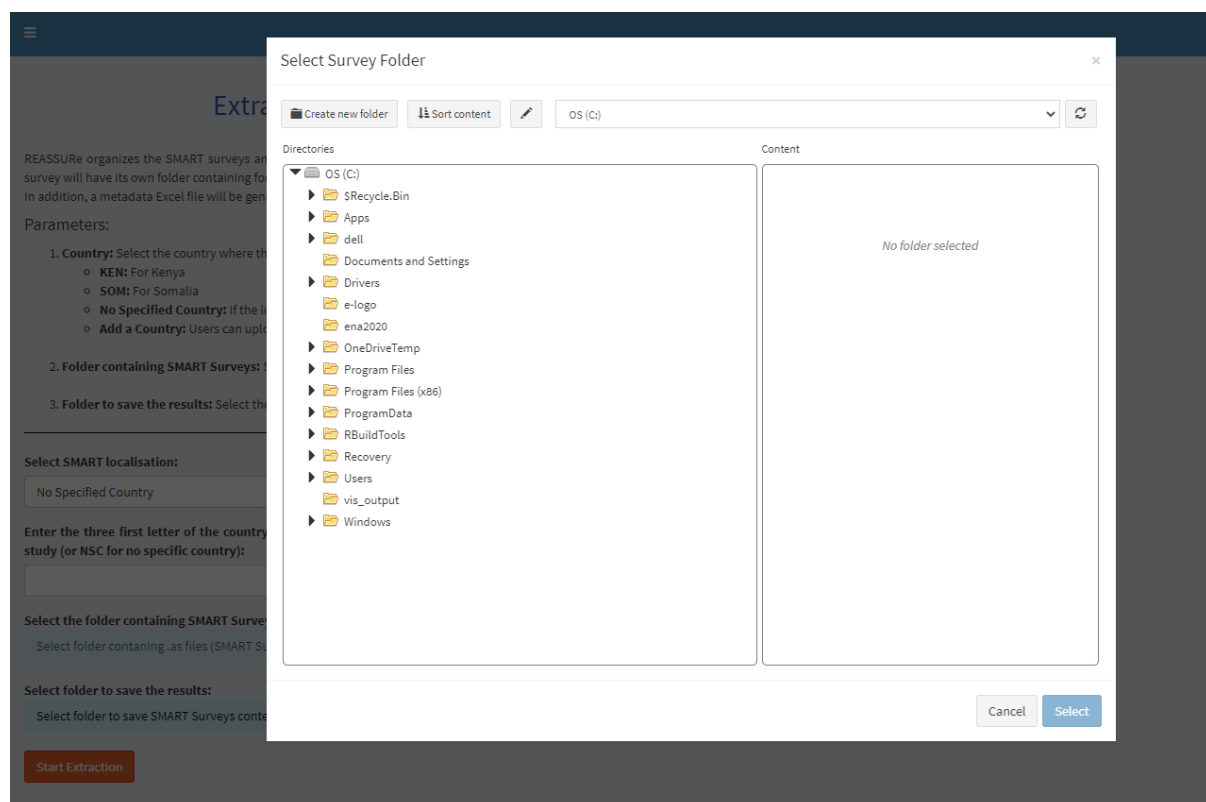


Figure 18. Select the path where the SMART survey have been saved.

4. Select the folder to save the different results.

REASSURE

Extract SMART Survey Content

REASSURE organizes the SMART surveys and extracts their contents (clusters, nutrition, and mortality data) into a specified output folder. Each SMART survey will have its own folder containing four files: nutrition, mortality, cluster, and the raw SMART file. In addition, a metadata Excel file will be generated, listing the name, location, and date of each SMART survey.

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 - KEN:** For Kenya
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 - No Specified Country:** If the location is irrelevant or surveys were conducted in multiple countries.
 - Add a Country:** Users can upload the other country's administrative level file. Refer to the documentation for file content details.
- Folder containing SMART Surveys:** Select the folder containing the .as files.
- Folder to save the results:** Select the folder to save the extracted content.

Select SMART localisation:

Select the folder containing SMART Surveys:

Select folder to save the results:

Start Extraction

CLICK HERE

Figure 19. Select the path where the results will be saved

EXAMPLE of SMART Survey Extraction

1. Enter the different parameters.

REASSURE

Extract SMART Survey Content

REASSURE organizes the SMART surveys and extracts their contents (clusters, nutrition, and mortality data) into a specified output folder. Each SMART survey will have its own folder containing four files: nutrition, mortality, cluster, and the raw SMART file. In addition, a metadata Excel file will be generated, listing the name, location, and date of each SMART survey.

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 - KEN:** For Kenya
 - SOM:** For Somalia
 - No Specified Country:** If the location is irrelevant or surveys were conducted in multiple countries.
 - Add a Country:** Users can upload the other country's administrative level file. Refer to the documentation for file content details.
- Folder containing SMART Surveys:** Select the
- Folder to save the results:** Select the folder to save the extracted content.

Select SMART localisation:

Select the folder containing SMART Surveys:

Select folder to save the results:

Start Extraction

Localisation

path

path

Figure 20. Example of the different parameters filled in the Data Extraction tab.

If the app cannot automatically find the correct localization, you will be prompted to manually select the appropriate location. This ensures that the data is correctly categorized and analysed according to its geographical context.

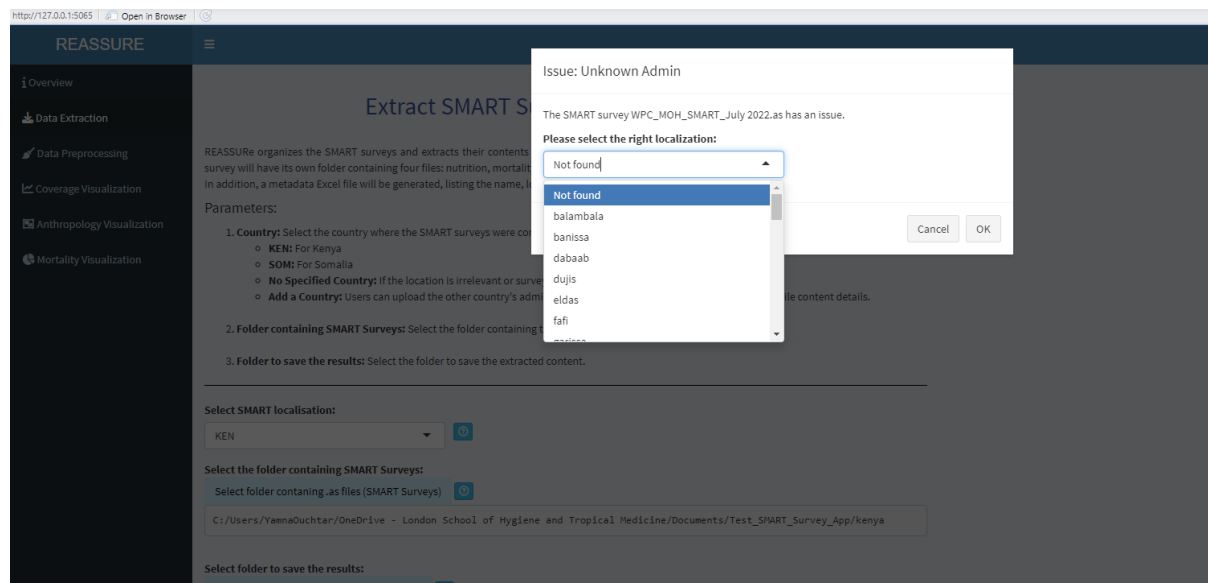


Figure 21. Example of the pop-up window that appears if one of the SMART surveys has not been located correctly.

2. Once all the SMART Survey have been extracted, you will see the following figures.

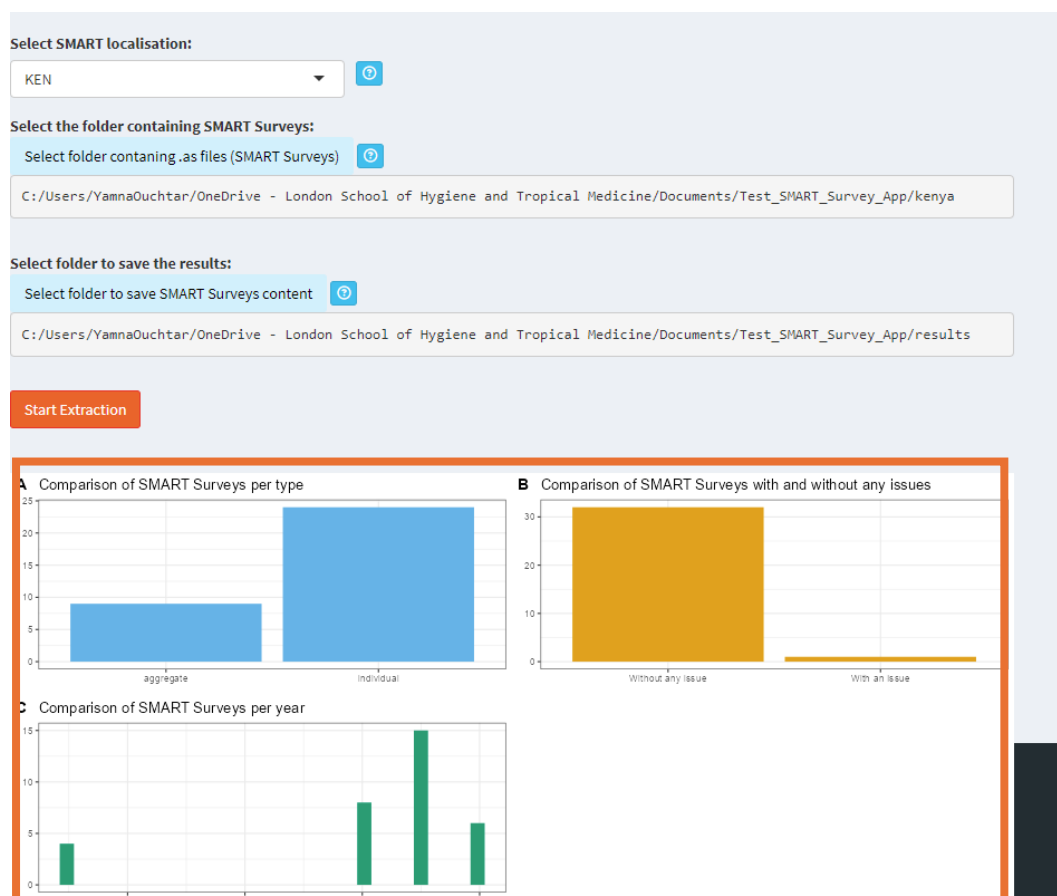


Figure 22. Example of the figures that will appear once extraction is complete.

- In the folder where you saved the input, you will find a separate directory for each SMART Survey. Additionally, a folder named `smart_with_issue` will contain surveys with localization or date issues. A metadata Excel file will also be created, summarizing the analyzed SMART surveys.

ken_admin2_saku_2022_7_0	✓	22/08/2024 14:31	File folder	
ken_admin2_saku_2023_7_0	✓	22/08/2024 14:31	File folder	
ken_admin2_turkanacentral_2017	✓	22/08/2024 14:31	File folder	
ken_admin2_turkanacentral_2023	✓	22/08/2024 14:31	File folder	
ken_admin2_turkanacentral_2024	✓	22/08/2024 14:31	File folder	
ken_admin2_turkananorth_2017_6	✓	22/08/2024 14:31	File folder	
ken_admin2_turkananorth_2023_6	✓	22/08/2024 14:31	File folder	
ken_admin2_turkananorth_2024_3	✓	22/08/2024 14:31	File folder	
ken_admin2_turkanasouth_2017_6	✓	22/08/2024 14:31	File folder	
ken_admin2_turkanasouth_2023_6	✓	22/08/2024 14:31	File folder	
ken_admin2_turkanasouth_2024_3	✓	22/08/2024 14:31	File folder	
ken_admin2_turkanawest_2017_6_	✓	22/08/2024 14:31	File folder	
ken_admin2_turkanawest_2023_6_	✓	22/08/2024 14:31	File folder	
ken_admin2_turkanawest_2024_3_	✓	22/08/2024 14:31	File folder	
smart_with_issue	✓	22/08/2024 14:31	File folder	
metadata	✓	22/08/2024 14:31	Microsoft Excel Comma...	7 KB

Figure 23. Example of different folders obtained after the extraction.

OneDrive > ... Documents > Test_SMART_Survey_App > results > ken_admin2_moyale_2022_7_0					
Sort View ...					
Name	Status	Date modified	Type	Size	
ken_admin2_moyale_2022_7_0_clusters_data	✓	22/08/2024 14:31	Microsoft Excel Comma...	1 KB	
ken_admin2_moyale_2022_7_0_mortality_data	✓	22/08/2024 14:31	Microsoft Excel Comma...	237 KB	
ken_admin2_moyale_2022_7_0_nutrition_data	✓	22/08/2024 14:34	Microsoft Excel Comma...	65 KB	
Marsabit_202207_MoH_Partners_Mbt_Moyale Sub-co...	✓	22/08/2024 14:31	AS File	102 KB	

Figure 24. Example of information extracted from the SMART Survey and available in one repository: cluster data, mortality data, nutrition data, and the raw SMART survey file.

Tab 2: Cleaning SMART Survey Content

1. Click on the Data Preprocessing tab

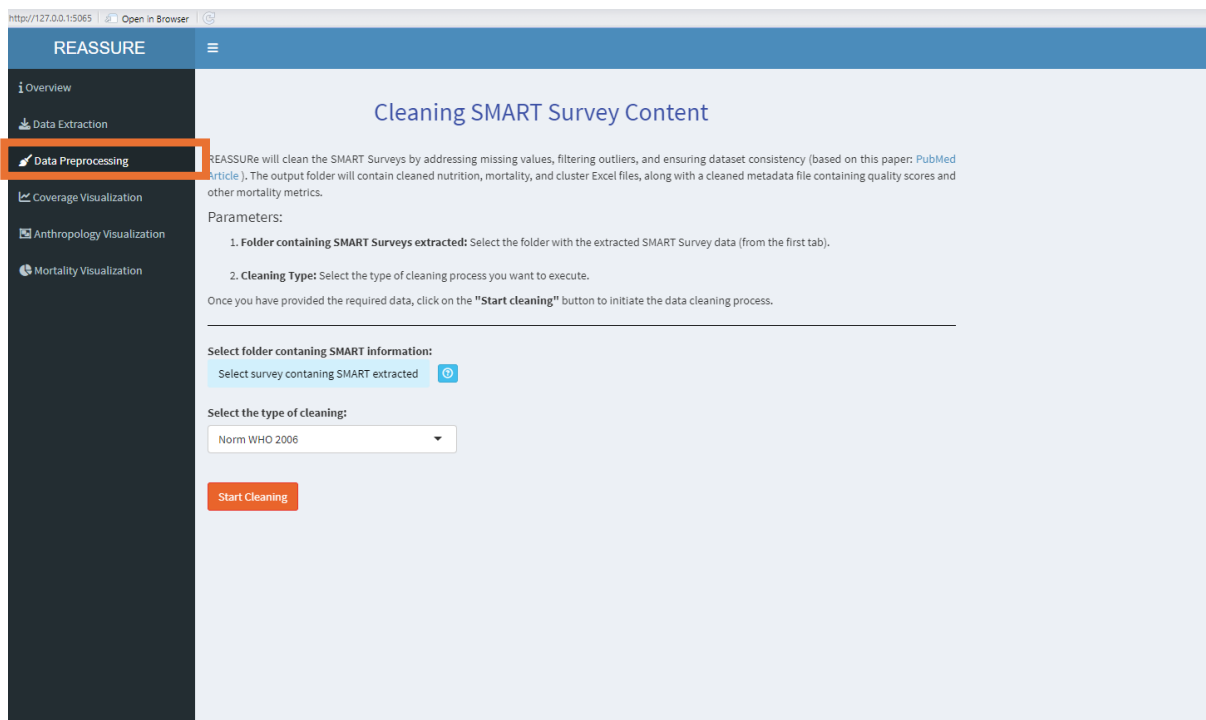


Figure 25: Overview of the Data Preprocessing tab.

2. Specify the location where the SMART surveys were extracted. If you have previously completed the extraction step, this path will be automatically filled..

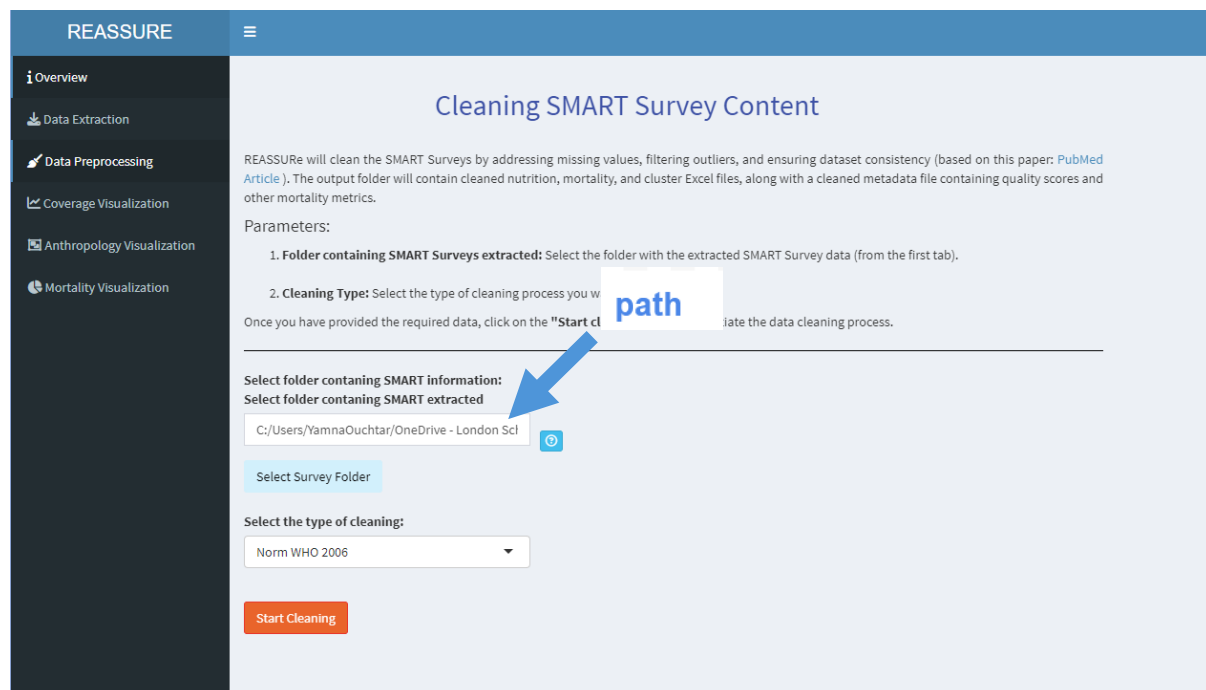


Figure 25: Overview of parameter to fill.

3. Choose the cleaning process you want to execute.

REASSURE

Overview

Data Extraction

Data Preprocessing

Coverage Visualization

Anthropology Visualization

Mortality Visualization

Cleaning SMART Survey Content

REASSURE will clean the SMART Surveys by addressing missing values, filtering outliers, and ensuring dataset consistency (based on this paper: [PubMed Article](#)). The output folder will contain cleaned nutrition, mortality, and cluster Excel files, along with a cleaned metadata file containing quality scores and other mortality metrics.

Parameters:

1. **Folder containing SMART Surveys extracted:** Select the folder with the extracted SMART Survey data (from the first tab).
2. **Cleaning Type:** Select the type of cleaning process you want to execute.

Once you have provided the required data, click on the "Start cleaning" button to initiate the data cleaning process.

Select folder containing SMART information:
Select folder containing SMART extracted

C:/Users/YamnaOuchtar/OneDrive - London Scl

Select Survey Folder

Select the type of cleaning:

Norm WHO 2006

Norm WHO 2006

Norm used in the ENA Software

Norm WHO 1995

Norm WHO 1995 (growth)

Norm Epi

Figure 26: Overview of type of cleaning choices.

4. Once you have selected the parameters of your choice, click on 'Start Cleaning'. Once the process is completed, some figures will appear.

Cleaning SMART Survey Content

REASSure will clean the SMART Surveys by addressing missing values, filtering outliers, and ensuring dataset consistency (based on this paper: [PubMed Article](#)). The output folder will contain cleaned nutrition, mortality, and cluster Excel files, along with a cleaned metadata file containing quality scores and other mortality metrics.

Parameters:

1. **Folder containing SMART Surveys extracted:** Select the folder with the extracted SMART Survey data (from the first tab).

2. **Cleaning Type:** Select the type of cleaning process you want to execute.

Once you have provided the required data, click on the **"Start cleaning"** button to initiate the data cleaning process.

Select folder containing SMART information:

Select folder containing SMART extracted

C:/Users/YamnaOuchtar/OneDrive - London Scl



Select Survey Folder

Select the type of cleaning:

Norm used in the ENA Software

Start Cleaning

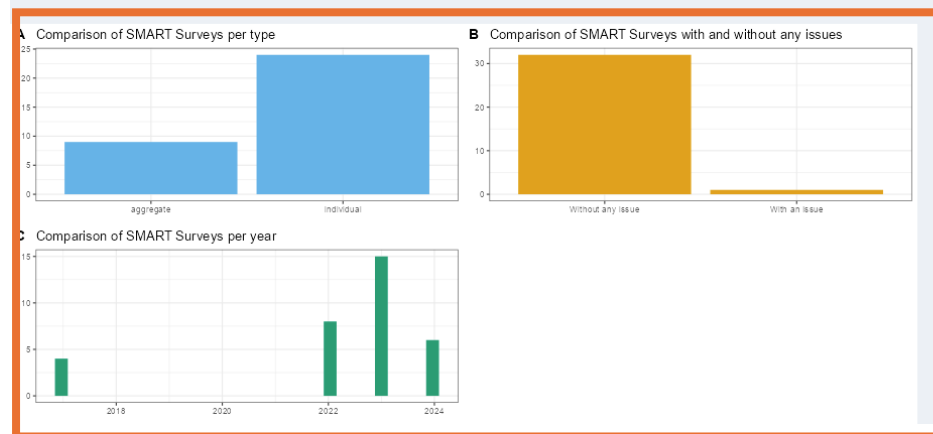


Figure 27. Example of the figures that will appear once cleaning is complete.

EXAMPLE of Cleaning SMART Survey Content

1. Below is an example of a folder you will obtain using the cleaning tab.

ken_admin2_turkanasouth_2023_6	✓	22/08/2024 14:35	File folder	
ken_admin2_turkanasouth_2024_3	✓	22/08/2024 14:35	File folder	
ken_admin2_turkanawest_2017_6_	✓	22/08/2024 14:35	File folder	
ken_admin2_turkanawest_2023_6_	✓	22/08/2024 14:35	File folder	
ken_admin2_turkanawest_2024_3_	✓	22/08/2024 14:35	File folder	
smart_with_issue	✓	22/08/2024 14:31	File folder	
metadata	✓	22/08/2024 14:31	Microsoft Excel Comma...	7 KB
metadata_clean	✓	22/08/2024 14:35	Microsoft Excel Comma...	16 KB

Figure 28. Example of different folders obtained after the cleaning.

2. In each folder, you will find the following Excel file.

Name	Status	Date modified	Type	Size
ken_admin1_wajir_2023_6_0_clusters_data	✓	22/08/2024 14:31	Microsoft Excel Comma...	1 KB
ken_admin1_wajir_2023_6_0_clusters_data_clean	✓	22/08/2024 14:34	Microsoft Excel Comma...	1 KB
ken_admin1_wajir_2023_6_0_mortality_data	✓	22/08/2024 14:31	Microsoft Excel Comma...	313 KB
ken_admin1_wajir_2023_6_0_mortality_data_clean	✓	22/08/2024 14:34	Microsoft Excel Comma...	58 KB
ken_admin1_wajir_2023_6_0_nutrition_data	✓	22/08/2024 14:34	Microsoft Excel Comma...	95 KB
ken_admin1_wajir_2023_6_0_nutrition_data_clean	✓	22/08/2024 14:34	Microsoft Excel Comma...	92 KB
Ken_Wajir_MOH_06_2023.as	✓	22/08/2024 14:31	AS File	134 KB
plausibility_check_Ken_Wajir_MOH_06_2023	✓	22/08/2024 14:34	Microsoft Word Docum...	1,217 KB

Figure 29. Example of different files obtained after the cleaning.

3. The folder will also contain a Word file with the data quality report.

REASSURE

SMART survey anthropometric data quality report

Country: ken
Admin Level: [REDACTED]
Month and year in which survey was completed: July 2022
Raw dataset filename: [REDACTED]

Overall anthropometric data plausibility score

Criterion	Flags	Excellent	Good	Acceptable	Problematic	Result
Percentage of flagged observations	Incl	0-2.5: 0 pts	>2.5-5.0: 5 pts	>5.0-7.5: 10 pts	>7.5: 20 pts	0.95
Significance of sex ratio difference	Incl	>0.1: 0 pts	>0.05: 2 pts	>0.001: 4 pts	<=0.001: 10 pts	0.31
Significance of age ratio difference (5-29 vs 30-59 months old)	Incl	>0.1: 0 pts	>0.05: 2 pts	>0.001: 4 pts	<=0.001: 10 pts	0.923
Digit preference score - weight	Incl	0-7: 0 pts	8-12: 2 pts	13-20: 4 pts	>20: 10 pts	3
Digit preference score - height	Incl	0-7: 0 pts	8-12: 2 pts	13-20: 4 pts	>20: 10 pts	7
Digit preference score - MUAC	Incl	0-7: 0 pts	8-12: 2 pts	13-20: 4 pts	>20: 10 pts	4
Standard Deviation of WHZ	Excl	<1.1 & >0.9: 0 pts	<1.15 & >0.85: 5 pts	<1.20 & >0.80: 10 pts	>=1.20 & <=0.80: 20 pts	1.02
Skewness of WHZ	Excl	<=-0.2: 0 pts	<=-0.4: 1 pts	<=-0.6: 3 pts	>=+0.6: 5 pts	0.041
Kurtosis of WHZ	Excl	<=-0.2: 0 pts	<=-0.4: 1 pts	<=-0.6: 3 pts	>=+0.6: 5 pts	0.018
Poisson distributed prevalence of WHZ < -2	Excl	>0.05: 0 pts	>0.01: 1 pts	>0.001: 3 pts	<=0.001: 5 pts	0.02
Total penalty points:		0-9	10-14	15-24	>=25	1

The overall score of this survey is 99% (100 - 1penalty_points). This is excellent

Note: the above table reproduces the plausibility score calculations performed by the ENA software. For each criterion, a certain number of penalty percentage points are deducted from the best-possible score of 100%. The best-quality surveys are those with the smallest number of penalty points.

Figure 30. Example of word file obtained after the cleaning.

Tab 3: Visualization of SMART Surveys coverage

1. Click on the **Coverage Visualization** tab.

The screenshot shows the REASSURE web application interface. On the left is a dark sidebar with a menu containing: Overview, Data Extraction, Data Preprocessing, Coverage Visualization (highlighted with an orange border), Anthropology Visualization, and Mortality Visualization. The main content area has a blue header with the title 'Visualization of SMART Surveys coverage'. Below the header, a text block states: 'This tab provides different visualization and will save them in a folder called **visualization_output**.' This is followed by a 'Parameters:' section with two numbered instructions: 1. 'Folder containing SMART Surveys cleaned: Select the folder with the cleaned SMART Surveys.' and 2. 'Type of plot: Select the plot you want to visualize and save. For each plot, click the "Start" button to launch the process.' Below these instructions, there is a section titled 'Select folder containing the cleaned SMART information:' which includes a text input field labeled 'Select folder containing metadata from SMART' and a blue folder icon button. Underneath is another section titled 'Select the type of plot you want to visualize:' with a dropdown menu currently showing 'Quality Score Histogram' and an orange 'Start Visualization' button at the bottom.

Figure 31: Overview of the Coverage Visualization tab.

2. Select the path where the SMART Surveys have been extracted and cleaned (the folder containing the metadata_clean Excel file). *If you have already cleaned the SMART surveys using the Data Preprocessing tab, the path will be automatically filled.*

This screenshot is similar to Figure 31 but shows the 'path' field populated with the text 'C:/Users/YamnaOuchtar/OneDrive - London School of Hygiene & Tropical Medicine/SMART Surveys/metadata_clean'. A blue arrow points from the word 'path' in the instruction text to this input field. The 'Start Visualization' button remains at the bottom of the form.

Figure 32: Select the path.

3. Choose the type of plot you want to generate from the available options.

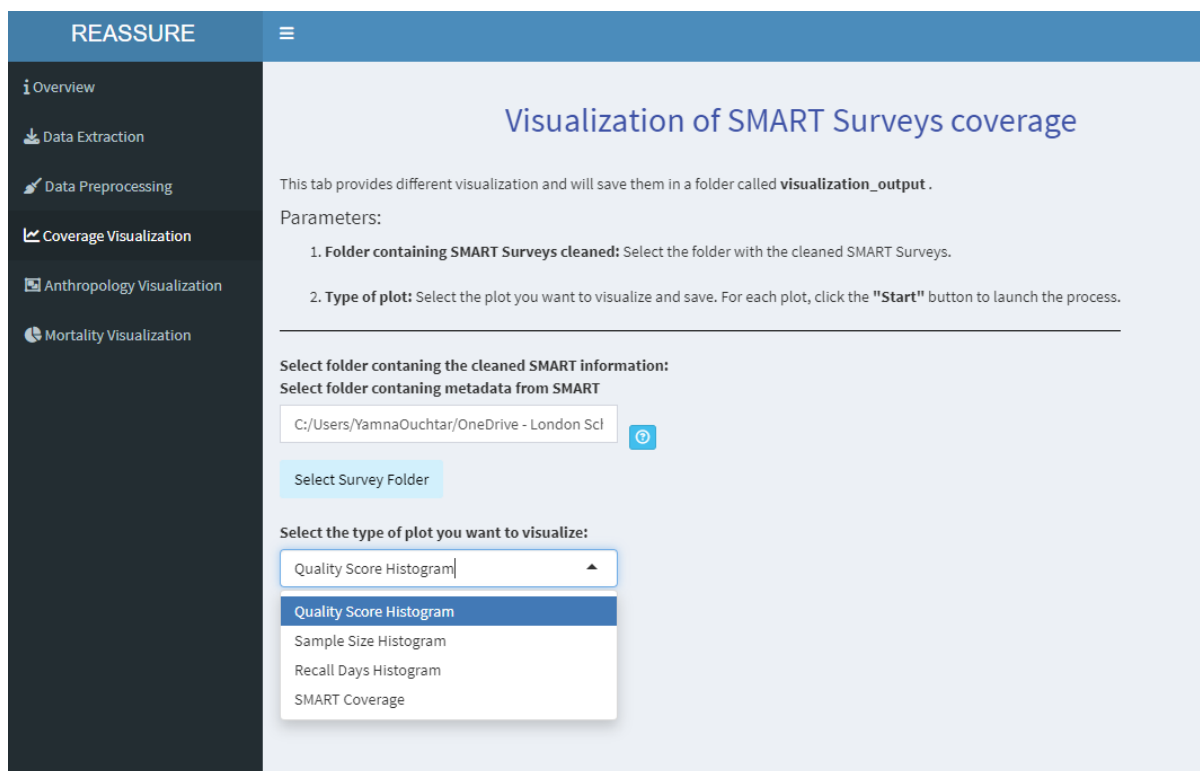


Figure 33: Overview of type of plot.

- Click on the **Start Visualization** button, and the plot will appear.

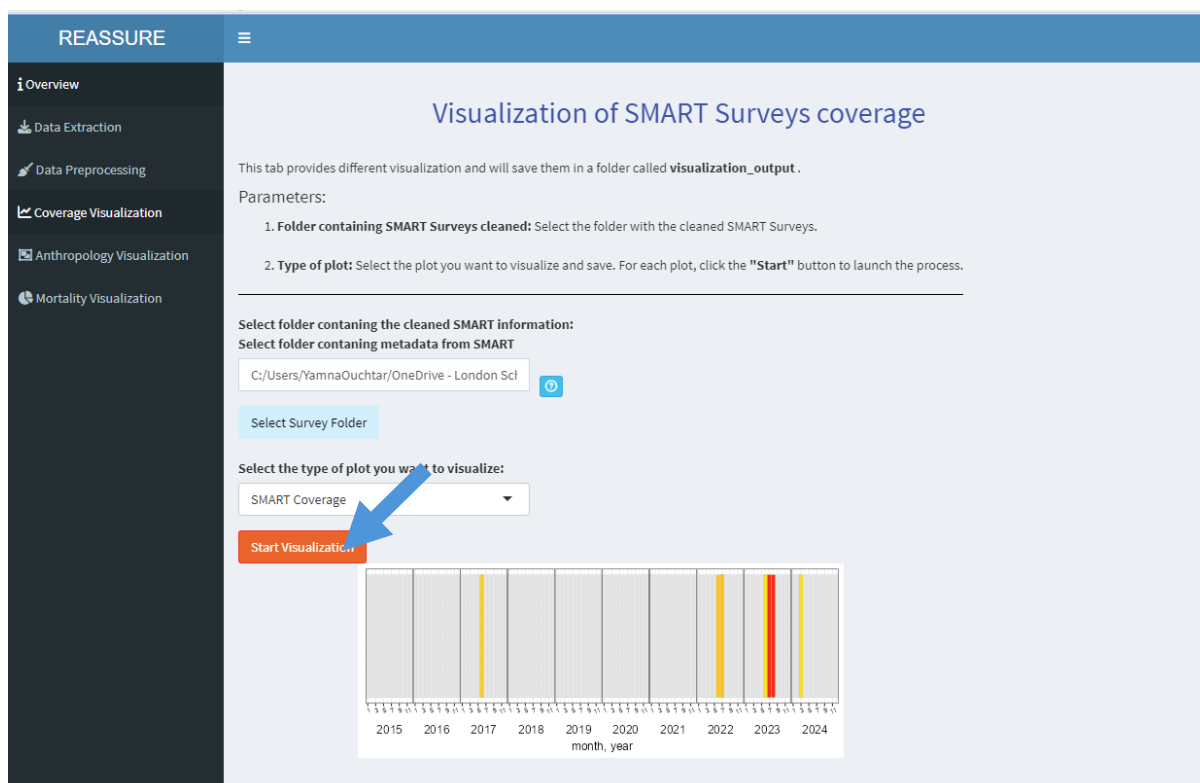


Figure 34: Overview of the plot visualization.

5. A folder called `visualization_output` will be created, and the plot will be saved in this folder.

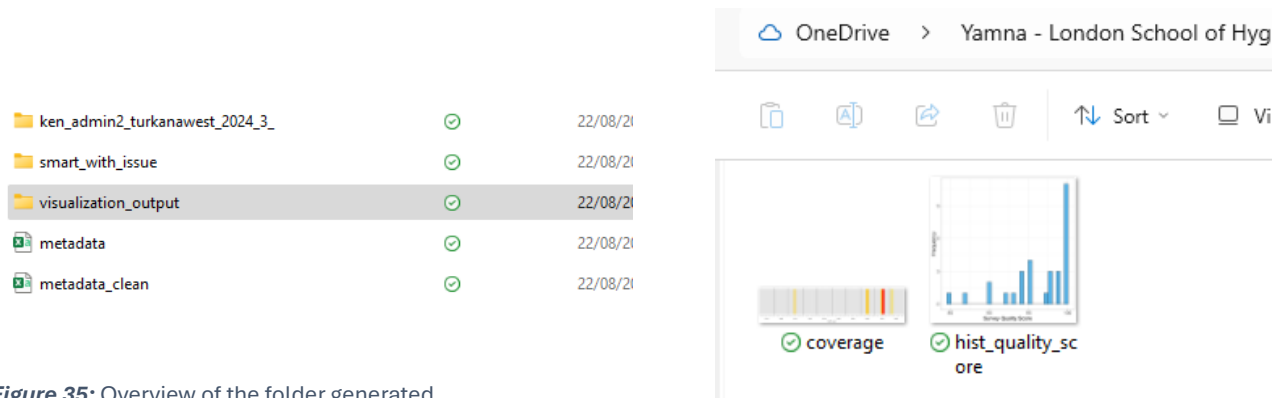


Figure 35: Overview of the folder generated.

Tab 4: Visualization of SMART Surveys anthropology

1. Click on the **Anthropology Visualization** tab.

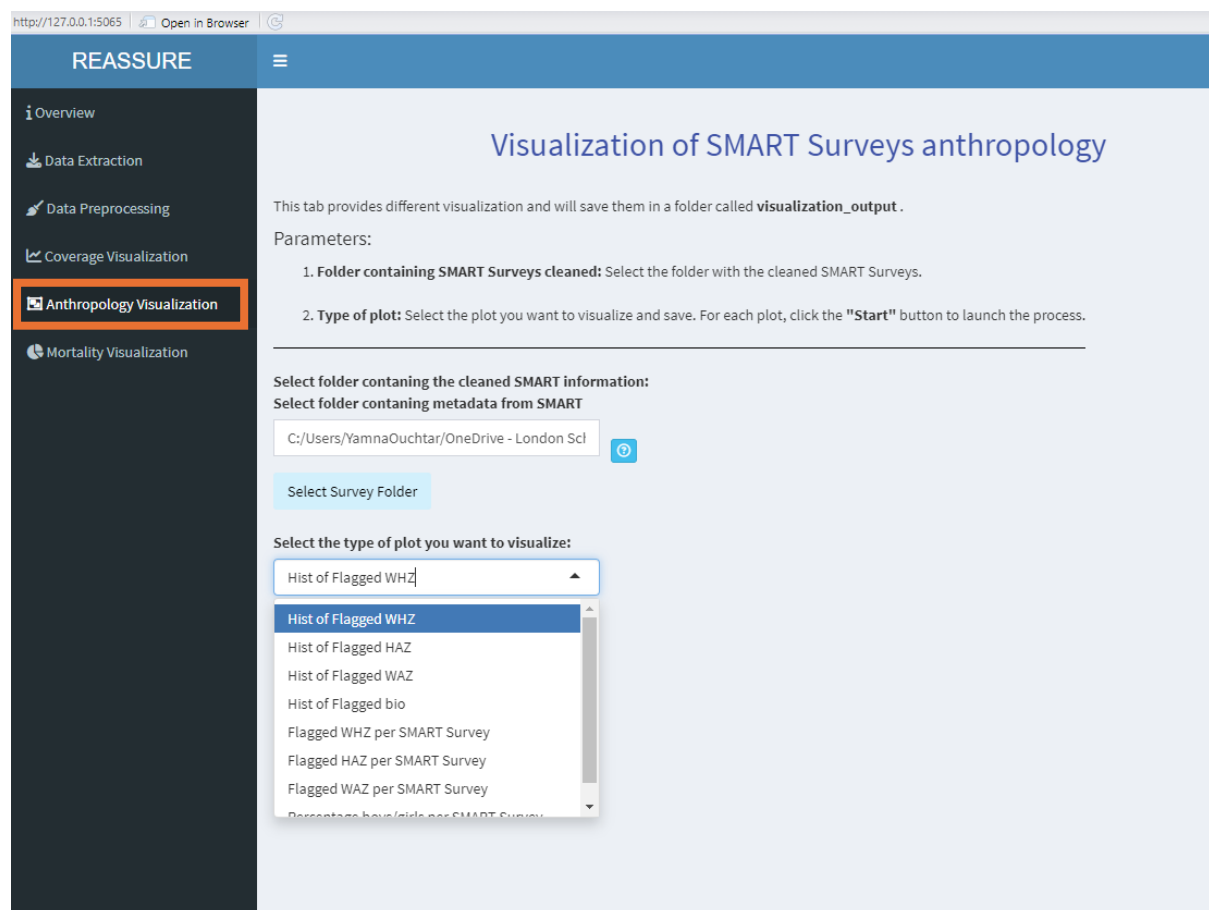


Figure 36: Overview of the Anthropology Visualization tab.

2. Follow the same steps as in Tab 3.

Tab 5: Visualization of SMART Surveys mortality

1. Click on the **Mortality Visualization** tab.

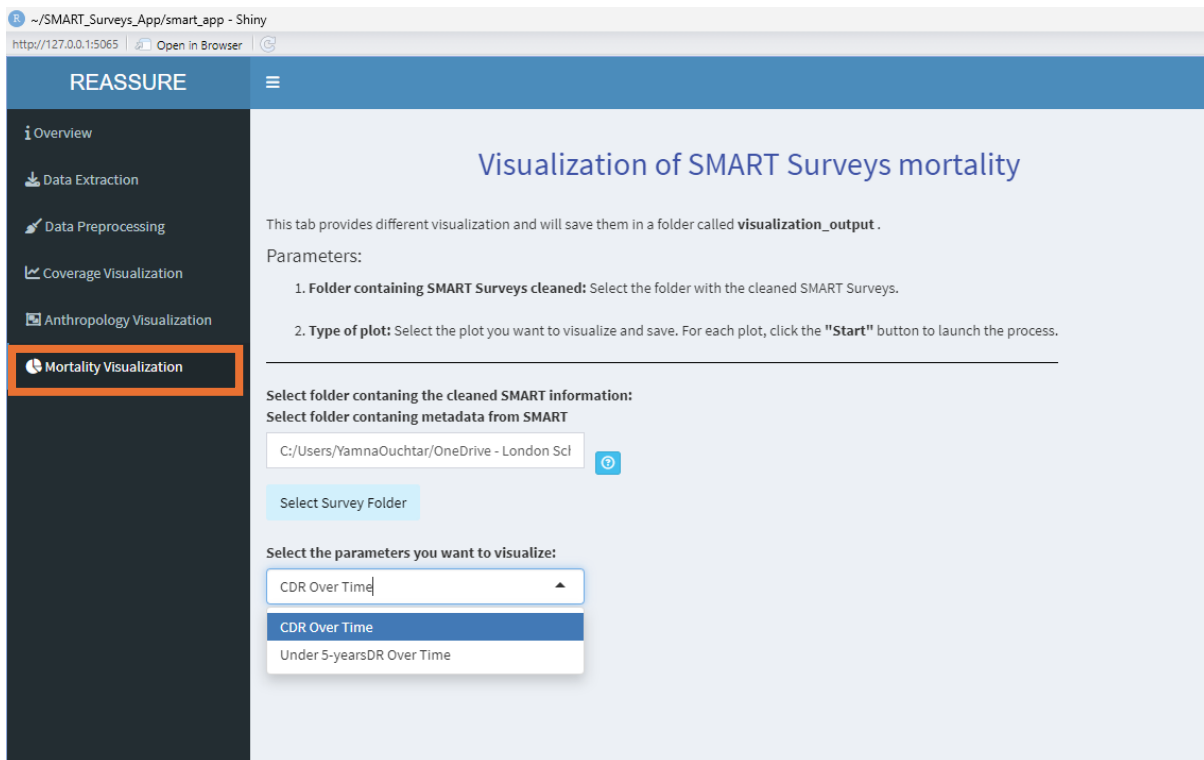


Figure 37: Overview of the Mortality Visualization tab

2. Follow the same steps as in Tab 3.