

Scientific Computing and Data Research Data Services

Introduction to REDCap

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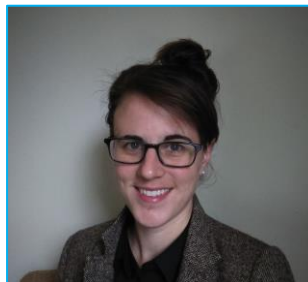
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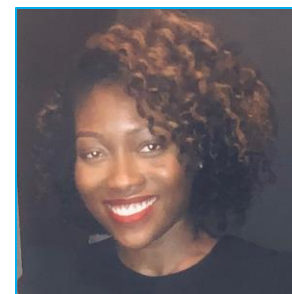
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Scientific Computing and Data Mission

To enable and accelerate biomedical discovery through collaborative research using high performance computing, biomedical informatics and data science

- ▶ We aim for our biomedical informatics ecosystem to be:
 - **More accessible** to stakeholders, ensuring broad, user-friendly, integrated access to diverse data sources while maintaining robust, secure, bi-directional information flow between research programs and point-of-care information systems through a flexible infrastructure
 - **More actionable**, to enable innovative applications of translational bioinformatics research and data-driven medicine...not just for the ecosystem at Sinai, but also for national research projects we lead and participate in.
 - High Performance Computing
 - Mount Sinai Data Warehouse
 - Research Data Services
- ▶ Unlike other computing resources, Scientific Computing stakeholders are also actively engaged in research projects
- ▶ We partner with other investigators to create a robust research environment at Mount Sinai, expand our profile in national research efforts, and help with grant funding success

REDCap at Mount Sinai

- ▶ Research Electronic Data Capture – a platform developed by Vanderbilt University as a proper replacement for pen and paper data collection
- ▶ 21 CFR Part 11 compliant – joint effort by Scientific Computing, IT, IRB and Privacy Offices
- ▶ Data resources and integration between many existing system with more to come
 - Import clinical data into REDCap from Epic (over 1800 mapped)
 - Basic Demographics
 - Conditions/Problems list
 - Medications
 - Vital signs
 - Laboratory Results (lab results where LOINC code is stored in Epic)
 - Submit requests to <https://bit.ly/3guXoag>
- ▶ We host more than 14,000 databases, with over 11,000 active users
- ▶ Services for project building, data protection, support, and training

Overview

- ▶ Creating your REDCap account
- ▶ Project Setup
 - Templates
 - Project page
 - Longitudinal Studies
 - Online Designer
 - Surveys
 - Variables
 - Obtaining Data
- ▶ Data Management
- ▶ Managing Users
- ▶ Project Life Cycle

Creating A REDCap Account

Mount Sinai Users:

- ▶ Mount Sinai faculty, students and staff can log into REDCap using their regular Mount Sinai username and password here: <https://redcap.mountsinai.org>

External Users:

- ▶ For users without Mount Sinai credentials, the PI or their delegate must request Mount Sinai credentials via SailPoint: <https://sailpoint.mountsinai.org/>
- ▶ Users new to Mount Sinai's REDCap instance will be presented email verification. After filling in their desired email, they will receive a verification link. Once verified, they can login to create projects or be added to existing ones.

Creating a New Project

- ▶ Users can find the projects they have access to under **My Projects** at the top of the page. These are projects they've been added to or have created.
- ▶ To create a project, click on the adjacent **New Project** button.
- ▶ Along the top bar, users will also find great resources under **Help & FAQ** as well as **Training Videos** for learning to use REDCap.

The screenshot shows the REDCap web application interface. At the top, there is a navigation bar with the REDCap logo and several menu items: 'Home', 'My Projects', 'New Project', 'Help & FAQ', 'Training Videos', 'Send-it', 'Messenger', and 'Control Center'. The 'My Projects' and 'New Project' buttons are highlighted with a red box, and the 'Help & FAQ' and 'Training Videos' buttons are highlighted with a blue box. Below the navigation bar, there is a section with links to training videos and a 'Clinical Data Pull (CDP)' section. Further down, there is a section titled 'We are billing for REDCap on a per project/database basis' and a 'Protect Your collected study data by moving projects to production' section. At the bottom, there is a table titled 'My Projects' with columns for Project Title, PID, Records, Fields, Instruments, Type, and Status. The table lists three projects under the 'Training and Practice' category: 'CD Oct 2021', 'LD1 Oct 2021', and 'NT Oct 2021'.

Project Title	PID	Records	Fields	Instruments	Type	Status
CD Oct 2021	14320	0	119	6 forms	■	✎
LD1 Oct 2021	14321	0	105	9 forms	■	✎
NT Oct 2021	14322	0	2	1 form	■	✎

Creating a New Project Cont'd

- ▶ When creating a new project, users can fill out **project details** and the type of research that will be conducted
- ▶ On the same page are **templates** for getting started on a new project

+ Create a new REDCap Project

You may begin the creation of a new REDCap project on your own by completing the form below and clicking the Create Project button at the bottom.

Project title:
Title to be displayed on project webpage

Purpose of this project:
How will it be used?

Name of P.I. (if applicable):
First name MI Last name

Email of P.I. (if applicable)
(e.g., Harris PA)

Name of P.I. as cited in publications (if applicable):
(e.g., Harris PA)

IRB number (if applicable):

Please specify:

- ☐ Basic or bench research
- ☒ Clinical research study or trial
- ☐ Translational research 1 (applying discoveries to the development of trials and studies in humans)
- ☐ Translational research 2 (enhancing adoption of research findings and best practices into the community)
- ☐ Behavioral or psychosocial research study
- ☐ Epidemiology
- ☐ Repository (developing a data or specimen repository for future use by investigators)
- ☐ Other

Assign project to a Project Folder? ☐

Project notes (optional):
Comments describing the project's use or purpose that are displayed on the My Projects page.

Start project from scratch or begin with a template?

- ☐ Create an empty project (blank slate)
- ☐ Upload a REDCap project XML file (CDISC ODM format) [?](#)
- ☒ Use a template (for those new to REDCap)

★ Choose a project template (comes pre-filled with fields, forms/surveys, and other settings) [+ Add templates \(Administrators only\)](#)

select template	Template title (sorted by title)	Template description
<input type="radio"/>	Basic Demography	Contains a single data collection instrument to capture basic demographic information.
<input type="radio"/>	Classic Database	Contains six data entry forms, including forms for demography and baseline data, three monthly data forms, and concludes with a completion data form.
<input type="radio"/>	Longitudinal Database (1 arm)	Contains nine data entry forms (beginning with a demography form) for collecting data longitudinally over eight different events.
<input type="radio"/>	Longitudinal Database (2 arms)	Contains nine data entry forms (beginning with a demography form) for collecting data on two different arms (Drug A and Drug B) with each arm containing eight different events.

Create Project **Cancel**

Getting Familiar with the Project Page

REDCap
Logged in as thejas01 | Log out
My Projects or Control Center
REDCap Messenger
View project as user: -- select a user --

Project Home and Design

- Project Home · Project Setup
- Designer · Dictionary · Codebook
- Project status: Development

Data Collection

- Survey Distribution Tools
 - Get a public survey link or build a participant list for inviting respondents
- Record Status Dashboard
 - View data collection status of all records
 - Add / Edit Records
 - Create new records or edit/view existing ones
- Show data collection instruments

Applications

- Alerts & Notifications
- Calendar
- Data Exports, Reports, and Stats
- Data Import Tool
- Data Comparison Tool
- Logging
- Field Comment Log
- File Repository
- User Rights and DAGs
- Customize & Manage Locking/E-signatures
- Data Quality
- API and API Playground
- REDCap Mobile App
- External Modules

Help & Information

- Help & FAQ
- Video Tutorials
- Suggest a New Feature
- Contact REDCap administrator

CD Oct 2021 **PID 14320**

Project Home Project Setup Other Functionality Project Revision History

Main project settings

Not started

- Disable Use surveys in this project? [?]
- Disable Use longitudinal data collection with defined events? [?]
- Modify project title, purpose, etc.

Design your data collection instruments & enable your surveys

Not started

Add or edit fields on your data collection instruments (survey and forms). This may be done by either using the Online Designer (online method) or by uploading a Data Dictionary (offline method). You may then enable your instruments to be used as surveys in the Online Designer. Quick links: [Download PDF of all instruments](#) OR [Download the current Data Dictionary](#)

Go to [Online Designer](#) or [Data Dictionary](#) Explore the [REDCap Shared Library](#)

Have you checked the [Check For Identifiers](#) page to ensure all identifier fields have been tagged?

Learn how to use [Smart Variables](#) [Piping](#) [Action Tags](#) [Field embedding](#)

Define your events and designate instruments for them

In progress

Create events for re-using data collection instruments and/or set up scheduling.

Go to [Define My Events](#) or [Designate Instruments for My Events](#)

Enable optional modules and customizations

Optional

- Enable Repeatable instruments [?]
- Disable Auto-numbering for records [?]
- Enable Scheduling module (longitudinal only) [?]
- Enable Randomization module [?]
- Enable Designate an email field for sending survey invitations [?]
- Additional customizations

Settings displayed to Administrators only:

- Enable Clinical Data Pull from Epic [?]
- Enable Twilio SMS and Voice Call services for surveys and alerts [?]

- Manage a project

- Check and edit participants' records, share survey invitation links and QR code

- Import, Export, and run Reports on collected data
- Modify User Access
- Configure External Modules

- Modify project title, PI, and descriptions
- Enable Longitudinal data collection

- Access the Online Designer
- Access/download the data dictionary
- Find information on unique REDCap functions

- Define how a longitudinal study is structured








- Extended customizations and modules options

Longitudinal Studies

- ▶ With longitudinal studies, additional options are available
- ▶ Define each of the study **Arms** and **Events** for those Arms
- ▶ Designate Instruments for each Arm and Event

Arm 1: Arm 1 +Add New Arm

Arm name: Arm 1 [Rename Arm 1](#)

	Event #	Event Name	Custom Event Label (optional)	Unique event name (auto-generated)
  	1	Event 1		event_1_arm_1
 	2	Event 2		event_2_arm_1
 	3	Event 3		event_3_arm_1
<div>Add new event</div> <div><input type="text"/></div> <div>Descriptive name for this event</div> <div><input type="text"/></div> <div>Custom Event Label (optional) Example: [visit_date], [weight] kg</div>				

Project Setup Define My Events Designate Instruments for My Events

Since you have defined multiple events on the [Define My Events](#) page, you may now select which data collection instruments that you wish to utilize for each event by using the table below. This allows you to enter data on any data collection form multiple times for any given project record. Any and all data collection instruments can thus be used for any event defined.

Click the [Begin Editing](#) button to change the relationships below by designating which forms you wish to utilize for which events. When you are finished making changes, click the [Save](#) button to finalize your changes.

[Upload or download instrument mappings](#)

[Begin Editing](#) [Save](#)

Data Collection Instrument	Event 1 (1)	Event 2 (2)	Event 3 (3)
Demographics (survey)	✓		
Baseline Data (survey)	✓		
Month 1 Data		✓	
Completion Data			✓

Online Designer – Instruments/Surveys

- ▶ Create, Import, and Manage data collection forms
- ▶ Enable instruments as surveys
- ▶ Edit data collection instruments and variables
- ▶ Define how participants can get automated invitations by email

Data Collection Instruments

Survey options:

Survey Queue

Survey Login

Survey Notifications

Upload or download Auto Invitations

Add new instrument:

Create

a new instrument from scratch

Import

a new instrument from the official [REDCap Shared Library](#)

Upload

instrument ZIP file from another project/user or [external libraries](#)

Instrument name	Fields	View PDF	Enabled as survey	Instrument actions	Survey-related options
Demographics	25			<div>Choose action</div>	<div> Survey settings</div> <div>+ Automated Invitations</div>
Baseline Data	18			<div>Choose action</div>	<div> Survey settings</div> <div>+ Automated Invitations</div>
Month 1 Data	19		<div>Enable</div>	<div>Choose action</div>	
Completion Data	5		<div>Enable</div>	<div>Choose action</div>	



Online Designer – Variables

- ▶ Variables allow users to define discrete data points for collection
- ▶ Short, simple, and identifiable names for variables are preferred
- ▶ Choose the field type that best fits the data point
- ▶ Note: Collection and maintenance of PHI in a protected and confidential manner is the responsibility of the investigators


The screenshot displays the 'Online Designer' interface for creating variables. At the top, a 'Contact Information' section shows two variables: 'First Name' (Variable: first_name) and 'Last Name' (Variable: last_name). Each variable has an 'Add Field' button. A red box highlights the 'Add Field' button for the 'Last Name' variable, with a red arrow pointing down to the 'Add New Field' dialog box.


The 'Add New Field' dialog box is open, showing a list of field types. The 'Text Box (Short Text, Number, Date/Time, ...)' option is selected. The dialog also includes sections for 'Field Label', 'Field Type', 'Question Number', 'Validation', 'Required?', 'Identifier?', 'Custom Alignment', and 'Field Note'. The 'Save' button is visible at the bottom right of the dialog.


Obtaining Data

- ▶ Invite participants to take a survey by sharing Public Survey URLs or QR codes
- ▶ Monitor follow-up surveys and previously sent invitations, manage the survey's participants list

Survey Distribution Tools

 Public Survey Link

 Participant List

 Survey Invitation Log

Using a public survey link is the simplest and fastest way to collect responses for your survey. You may obtain the survey link below to email it to your participants. Responses will be collected anonymously (unless the survey contains questions asking for identifying data from the participant). **NOTE:** Since this method uses a single survey link for all participants, it allows for the possibility of participants taking the survey multiple times, which may be necessary in some cases.

To obtain the survey link, copy the URL below and paste it into the body of an email message in your own email client. Your email recipient(s) can then click the link to begin taking your survey.


Public Survey URL:





OR Short Public Survey URL:





Link Actions


 Open public survey


 Open public survey +  Log out


 Send me URL via email

 Survey Access Code or  QR Code

Link Customizations

 Get Short Survey Link

 Create Custom Survey Link

 Get Embed Code

Obtaining Data – Data Entry Form

- ▶ For data points that are not collected during the surveys, they can be entered in the **Record Home Page**
- ▶ Can enter new data, overwrite data, or make notes on data for the record

My Projects or Control Center
REDCap Messenger
View project as user: -- select a user --

Project Home and Design

- Project Home · Project Setup
- Designer · Dictionary · Codebook
- Project status: Development

Data Collection

- Survey Distribution Tools
 - Get a public survey link or build a participant list for inviting respondents
- Record Status Dashboard
 - View data collection status of all records
- Add / Edit Records
 - Create new records or edit/view existing ones

Study ID 1 [Select other record](#)

Data Collection Instruments:

- Demographics**
- Baseline Data
- Month 1 Data
- Completion Data

Applications

- Alerts & Notifications
- Calendar
- Data Exports, Reports, and Stats
- Data Import Tool

Demographics

Adding new Study ID 1

Study ID 1

Date subject signed consent Today Y-M-D

Upload the patient's consent form [Upload file](#)

Contact Information

First Name

Last Name

Street, City, State, ZIP

Phone number

E-mail

Date of birth Today Y-M-D

Age (years) View equation

Study ID 1				
Data Collection Instrument	Event 1	Event 2	Event 3	
Demographics (survey)	✓			
Baseline Data (survey)	●			
Month 1 Data		●		
Completion Data				●
Delete all data on event:	✗	✗		

Data Management

▣ **Data Exports, Reports, and Stats** contain methods to export collected data in various formats

▣ Custom selections can be made to isolate data of interest from larger project databases

Data Collection

- Survey Distribution Tools
 - Get a public survey link or build a participant list for inviting respondents
- Record Status Dashboard
 - View data collection status of all records
- Add / Edit Records
 - Create new records or edit/view existing ones

Applications

- Alerts & Notifications
- Calendar
- Data Exports, Reports, and Stats
- Data Import Tool
- Data Comparison Tool
- Logging

you get the exact data you want. Once you have created a report, you may view it as a webpage, export it out of the format (Excel, SAS, Stata, SPSS, R), or view the plots and descriptive statistics for that report.

My Reports & Exports		
	Report name	View/Export Options
A	All data (all records and fields)	View Report Export Data Stats & Charts
B	Selected instruments and/or events (all records)	Make custom selections
+ Create New Report		

Exporting "All data (all records and fields)"

Select your export settings, which includes the export format (Excel/CSV, SAS, SPSS, R, Stata) and if you wish to perform de-identification on the data set.

Choose export format

- ☒ CSV / Microsoft Excel (raw data)
- ☐ CSV / Microsoft Excel (labels)
- ☐ SPSS Statistical Software
- ☐ SAS Statistical Software
- ☐ R Statistical Software
- ☐ Stata Statistical Software
- ☐ CDISC ODM (XML)

De-identification options (optional)

The options below allow you to limit the amount of sensitive information that you are exporting out of the project. Check all that apply.

Known Identifiers:

- ☐ Remove all tagged identifier fields (tagged in Data Dictionary)
- ☐ Hash the Record ID field (converts record name to an unrecognizable value)

Free-form text:

- ☐ Remove unvalidated Text fields (i.e. Text fields other than dates, numbers, etc.)
- ☐ Remove Notes/Essay box fields

Date and datetime fields:

- ☐ Remove all date and datetime fields
- ☐ OR —
- ☐ Shift all dates by value between 0 and 364 days (shifted amount determined by algorithm for each record) [What is date shifting?](#)
- ☐ Also shift all survey completion timestamps by value between 0 and 364 days (shifted amount determined by algorithm for each record)

[Deselect all options](#)

Additional export options

- ☒ Export survey identifier field and survey timestamp field(s)?

Advanced data formatting options

Set CSV delimiter character

Set the delimiter used to separate values in the CSV data file (only valid for CSV Raw Data and CSV Labels export formats):

Force all numbers into a specified decimal format?

You may choose to force all decimal values containing a decimal to have a specified decimal character (comma or period/full stop). This will be applied to all calculations and number-validated text values in the export file.

NOTE: Your data formatting selections above will be remembered in the future and will be pre-selected upon your next export.


[Export Data](#) [Cancel](#)

CSV / Microsoft Excel (raw data)

You may download the survey results in CSV (comma-separated) format, which can be opened in Excel. You have the choice of downloading the data either with the full headers and answer labels or just with the answer codes (i.e. raw data).

NOTE: If you are using a version of Microsoft Excel prior to Excel 2007, due to limitations the data will only be read to 255 columns when opened.

[Click icon\(s\) to download.](#)

 [Raw](#)

[Send file!](#)

Data Management – Editing Data

- ▶ Data edits can be made on csv files in Excel
- ▶ Records show all data collected for a specific **Event** and **Arm**
- ▶ Some data will appear as entered by survey participants with free text entry, while other data is coded as discrete selections as in the case of multiple-choice selections

[illegible]

Data Management – Importing


- ▶ **Data Import Tool** allows for users to import new data or edited data by each record
- ▶ An effective tool for importing larger blocks of data
- ▶ Don't be intimidated by errors since they are a common occurrence in data imports
- ▶ Each error will need to be resolved before a set of data can be successfully uploaded

Record format: The file to be uploaded has its records stored as separate Rows

Format for date and datetime values: MM/DD/YYYY or YYYY-MM-DD

Allow blank values to overwrite existing saved values? No, ignore blank values in the file (default)

Name the imported records automatically (force record auto-numbering) ? No, use the record name provided

 Upload your CSV file:

CDOct2021_...-18_1325.csv

❗ Errors were detected in the import file that prevented it from being loaded.


There are 24 errors (shown in red in the error table below) in this dataset. Please correct any errors and upload the file again.

ERROR DISPLAY TABLE			
Record	Field Name	Value	Error Message
1	demographics_timestamp	10/18/2021 12:44	This field name does not exist in the project.
1	baseline_data_timestamp		This field name does not exist in the project.
1	month_1_data_complete	1	This field ('month_1_data_complete') exists on an instrument that is not designated for the event named 'Event 1'. You are not allowed to import data for this field into this event.
1	completion_data_complete	0	This field ('completion_data_complete') exists on an instrument that is not designated for the event named 'Event 1'. You are not allowed to import data for this field into this event.
1	demographics_timestamp		This field name does not exist in the project.
1	baseline_data_timestamp		This field name does not exist in the project.
2	demographics_timestamp		This field name does not exist in the project.


Managing Project Users

- ▶ Users with accounts can be added to a project in the **User Rights** section of your project
- ▶ When adding or modifying existing users, a long checkbox section will appear to manage their access
- ▶ It is important to properly manage user rights to protect data and PHI, control project design and life cycle, and maintain accountability


Add new users: Give them custom user rights or assign them to a role.

 Add new user

— OR —

 Assign new user


Create new roles: Add new user roles to which users may be assigned.

 Enter new role name




(e.g., Project Manager, Data Entry Person)

Role name (click role name to edit role)	Username or users assigned to a role (click username to edit or assign to role)	Expiration (click expiration to edit)	Project Design and Setup	User Rights
—	thejas01 (Sai Theja)	never	✓	✓




Basic Rights

 Expiration Date (M/D/Y)
(if applicable)









Highest level privileges:

-  Project Design and Setup ☒
-  User Rights ☒
-  Data Access Groups ☒


Privileges for data exports (including PDFs and API exports, reports, and stats):

-  Data Exports ☐ No Access ☐ De-identified* ☐ Remove all tagged identifier fields ☒ Full Data Set
-  Add/Edit/Organize Reports ☒
Also allows user to view ALL reports (but not necessarily all data in the reports)
-  Stats & Charts ☒




Other privileges:

-  Survey Distribution Tools ☒
-  Calendar ☒
-  Data Import Tool ☒
-  Data Comparison Tool ☒
-  Logging ☒
-  File Repository ☒
-  Data Quality ☒ Create & edit rules ☒ Execute rules [What is Data Quality?](#)
-  API ☐ API Export ☐ API Import/Update [What is the REDCap API?](#)

Settings pertaining to the REDCap Mobile App:

-  REDCap Mobile App ☒ Allows user to collect data offline in the mobile app [What is the REDCap Mobile App?](#)
- ☒ Allow user to download data for all records to the app?

Settings pertaining to project records: [Explain these settings](#)

-  Create Records ☒
-  Rename Records ☐
-  Delete Records ☐

Data Entry Rights

NOTE: The data entry rights "only" pertain to a user's ability to view or edit data on a web page in REDCap (e.g., data entry forms, reports). It has no effect on data imports or data exports.

	No Access	Read Only	View & Edit	Edit survey responses
Demographics (survey)	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="checkbox"/>
Baseline Data (survey)	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="checkbox"/>
Month 1 Data	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	
Completion Data	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	

Project Life Cycle

- ▶ **Development** phase of the project is best for creating and testing a project
- ▶ **Production** phase protects collected data by flagging project changes for data loss review
- ▶ **Analysis/Cleanup** phase for finalizing analysis and ending a study

Project Status Management



REDCap – 2021/2022 Updates

- ▶ New annual REDCap Production fee rate of \$200 per project
- ▶ Database Improvements
 - Additional layer of encryption for protecting PHI
- ▶ REDCap Upgrades
 - Server hardware upgrades and consolidation
 - Upgrade to REDCap version 11 in the works
 - Project Dashboards
 - Smart Functions
 - Smart Tables
 - Smart Charts
 - Expanded Epic CDP options
- ▶ Deploying External Modules
 - Deployed 4 new external modules for use in projects
 - Additional deployments underway and can also be requested by users

Digital Concierge Service - <https://zoom.us/my/digitalconcierge>

- ▶ Virtual REDCap Office Hours: Wednesdays from 3:30pm to 4:30pm
 - CRIO Office; Office of Research Services (ORS);
 - Scientific Computing; CTSA;
 - Levy Library ASC-IT; Research Academic IT
- ▶ Guiding use of self-service tools
- ▶ Directing to optimal digital services and data sources
- ▶ Identifying right data sets
- ▶ Formulating and/or executing search queries
- ▶ Advising on Mount Sinai policies including data sharing, security and patient privacy
- ▶ Posting de-identified counts for the most common queries
- ▶ Aggregating feedback and questions from research community
- ▶ Providing informatics support for grant submissions