

INTRODUCTION TO



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Health
Central Coast
Local Health District

Learning Objectives

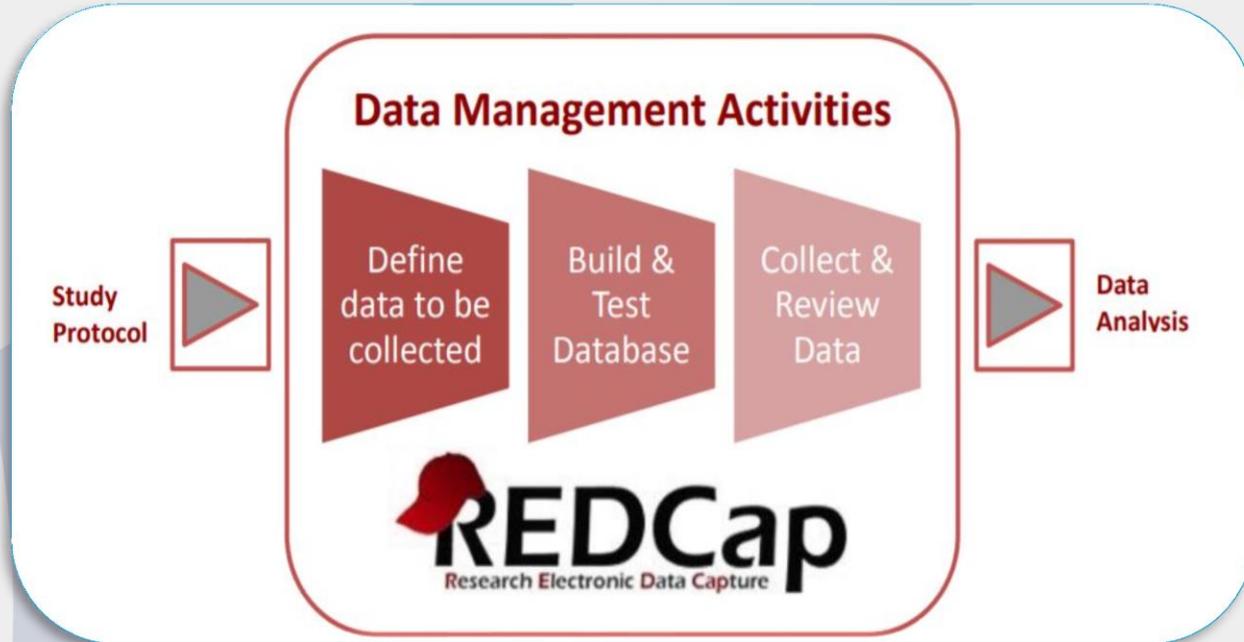
- Overview of REDCap
- Stages in developing REDCap databases and creating projects
- Project workflow
- Key Features
- The difference between surveys and data forms
- Creating and distributing surveys
- Allocating user rights and creating reports
- Advantages of using REDCap

Overview

- REDCap  Research **E**lectronic **D**ata **C**apture
- Is a secure web based data collection tool
- Developed by Vanderbilt University in 2014 and shared with academic and non-profit institutions at no cost
- REDCap Community, a network of collaborators that has thousands of active institutional partners in over one hundred countries

Overview Continued

- REDCap is a data management tool that can be used for Research and Quality Improvement studies



Applications



Global Distribution



Institutions	Countries	Projects	Users	Articles
6360	151	1.7M	2.4M	23.1k



Health
Central Coast
Local Health District

REDCap Database Stages

➤ **Development**

When databases are created and edited

➤ **Production**

When all data collection happens

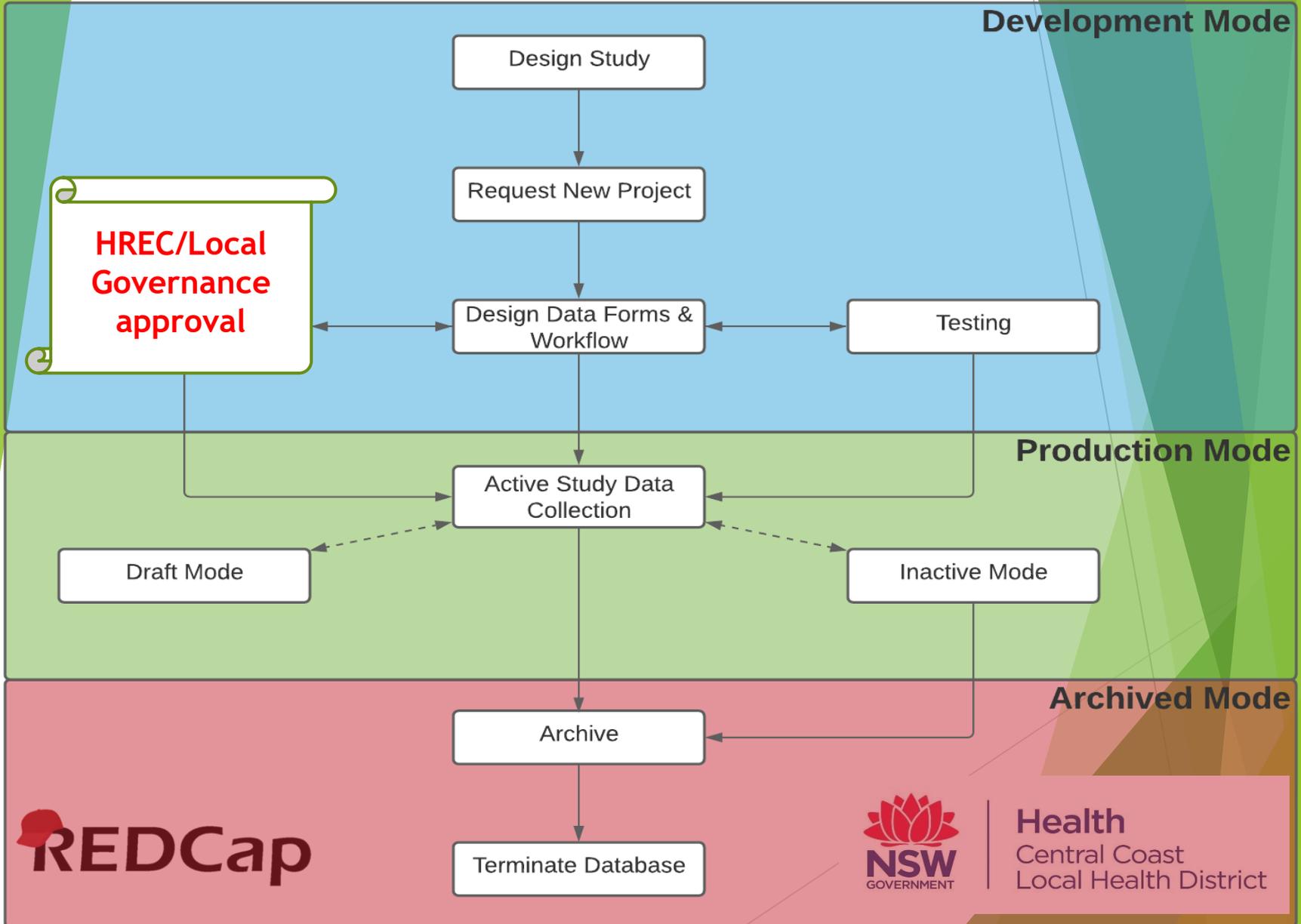
➤ **Inactive**

Data entry is temporarily halted; You can initiate this mode if you want to ensure that no new data entry will occur, but you would still like to access all of your data easily

➤ **Archived**

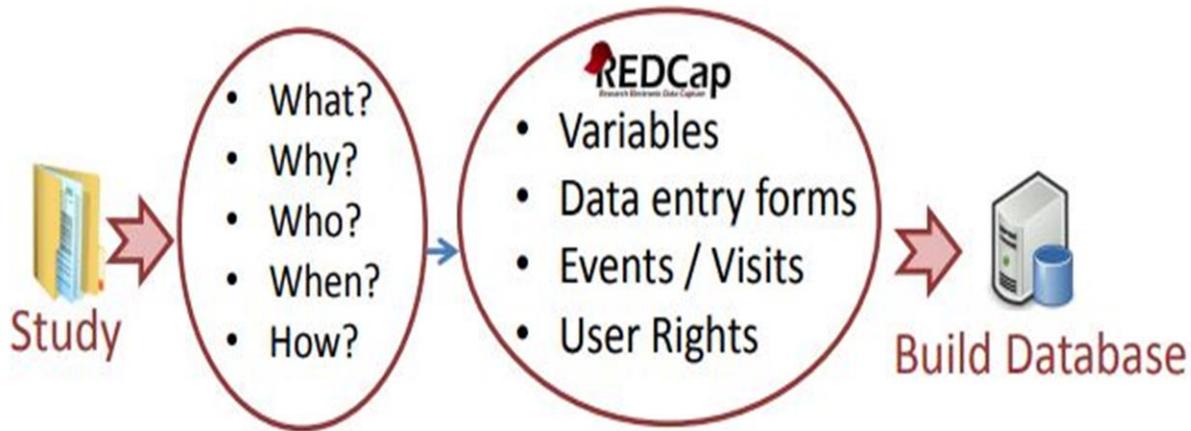
Removed from your list of project databases

Project Workflow



Project Workflow continued

The information that is going to be defined during this step will determine how to build the database.



Project Workflow continued

The following tasks are highly **recommended** before moving a project to production status!

Enter test data

- Using all fields in all instruments and all events
- To validate instrument and even definition
- Branching logic; Calculated fields, etc.



Review test data

- Open data entry forms
- Create reports
- Export data and send the blank CRF to the project team for review

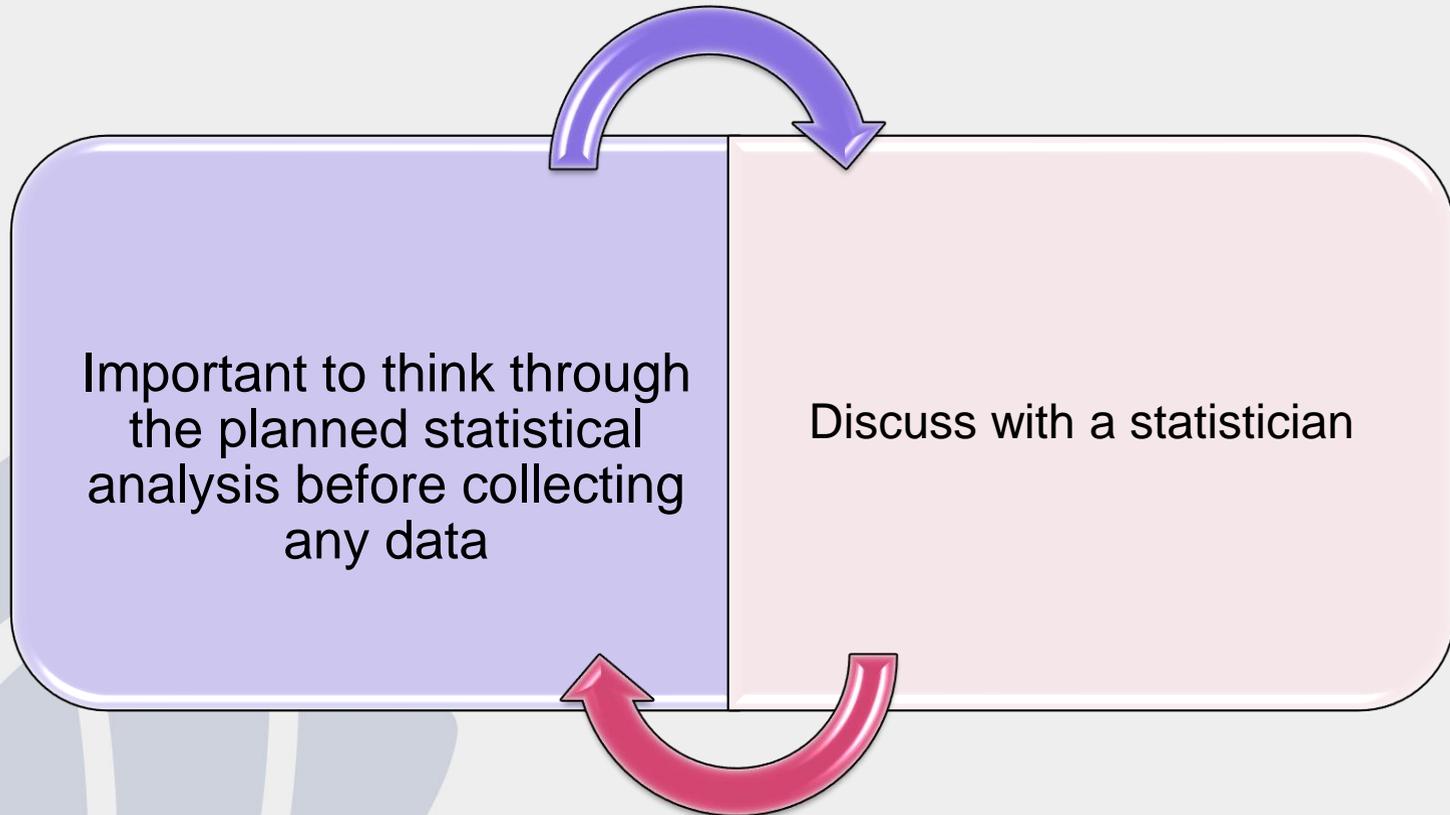


Statistician review your database

- Send a PDF version of the blank CRF
- Send the data dictionary of your database



Project Workflow continued



Key Features

Easy to use interface

Web-browser (Firefox or Chrome) based application software

Anyone without program knowledge can use this web-browser application without installing any additional software

REDCap can be used on any computer and mobile device with Internet Access

Repeating and longitudinal data collection

Repeated measures using same form with or without calendar /scheduling tool

Collect the data using the same form for the subject multiple times for increased convenience

Designed for a complex research project

Multi-Site study

People from different locations can access and enter data into the same REDCap data collection form

Users at different sites or groups maybe assigned in data access group, so own groups' data can be built up, viewed or edited within the site



Key Features

Web based survey

Used to collect data directly from survey participants

Using email invitation or public link for anonymous survey

Various Field types and validations options

Open-ended, multiple choices and selections, Calculated field, branching logic, file upload (under 10 MB)

Field validation options

Double Data Entry (DDE)

The administrator can enable this function in REDCap upon user request

Two users can enter the data for same subject ID, will then be compared and merged by the reviewer within the project team



Key Features

Data Export

Direct to statistical packages to analyse with de-identification options

Data export can be done by selected users from REDCap to different types of statistical software (**such as SPSS, SAS, Stata**), or Excel with some de-identification options

Importing Data

To bring the collected data from outside of REDCap into the current database

Can be used if the existing data can be converted into csv file (follow the REDCap database design definition)

Possible to input and merge data and continue the data collection

Reports

Gives the opportunity to get some sort of data with filter conditions

It doesn't do any statistical analysis, but presents the selected part of the entire data set



Key Features

Recommended for advanced user

API (Application Programming Interface)

- The API is use to import and export without logging into REDCap by using programming code, so this is for programming level users.
- A unique user token is given when required for this API function.

e-Consent Framework

- Provides standardized tools to obtain consent and store consent documentation with a certification screen and a storage function which automatically generates a 'hard-copy' PDF of the signed form.

Randomisation

- Implement a defined randomisation model within your project, allowing you to randomize your subjects.
- REDCap does not support dynamic randomisation.
- REDCap does not create the randomization table for you.
- The table must be generated outside of REDCap software (SAS, Stata, R), most likely by the statistician/ data analyst involved in your project.

Key Features

Data Security options

Data collection will be done under individual required secure log in with username and password

User access controls are provided

Only people who have rights to the database can view or edit the data

Every user may have different access user rights, as set up by the REDCap project owner following the study protocol

Identified information can be removed before exporting the data through the identification (optional)

Communication between the server and user is encrypted (security feature)



Definition and wording

- **Arms:** groups of events. You may want to employ multiple arms when using different treatment groups (control, experimental) or conducting a multi-site study, for instance.
- **Branching logic:** branching Logic may be employed when fields/questions need to be hidden for data entry under certain conditions.
- **Calendar:** project calendar to help organize the patients' scheduling and keep track of any upcoming events.
- **CRF:** Case Report Form.
- **Data Dictionary:** Excel file, containing the list of fields of a given project and their associated attributes.
- **Events:** used in longitudinal designs. An event is a scheduled (or unscheduled) occurrence during which data is captured using your REDCap data instruments (forms).
- **Field (or variable or question):** a singular data entry, such as age or height.



Definition and wording continued

- **File repository:** repository that stores and retrieves files and documents used for a project. Whenever a data export is performed, the resulting data and syntax files are also stored in the file repository of the project.
- **Instrument:** survey page or data entry form.
- **Logging:** module that lists all changes made to this project, including data exports, data changes, and the creation or deletion of users (audit trail).
- **Project status:** development, production, draft, inactive and archived.
- **Project type:** single survey or data entry form(s) or a mix of a single survey / data entry form(s).
- **Record label:** information/variables added to the unique ID of the study (e.g. pat_id) to help select the right record during data entry. For example, date of birth or last name can be added as record labels when selecting a subject for data entry. Record labels are displayed only and have no impact when exporting data.



Creating a Project

There are three project types available in REDCap

- a. Data collection performed only by study team  Data Entry Forms
- b. Data collection performed only by study participants  Survey
- c. Screening phase before enrolling subjects  Survey + Data Entry Forms



Creating a Project continued

Classic project with mix of surveys and data entry forms.

Instrument Name	Type	Comments
Demographics	Data Form	Contains email type field to capture subject's email address
Screening	Survey	Triggered when email is entered on Demographics form
Consent	Survey	Survey Queue - displayed when screening is complete and if eligibility criteria are met
Initial Data	Survey	Survey Queue – displayed if consent is completed and subject has provided consent
Randomization	Data Form	
Follow up	Survey	Automated Invite sent 6 months after Initial Data is completed and if subject is randomized

Creating a Project continued

There are two collection formats available for data entry forms:

1. Classic: One record per patient
2. Longitudinal: One record per patient per event, with the possibility of defining multiple arms

Data Collection Instrument	Events for Arm 1: Study Cases		
	Event 1 (1)	Event 2 (2)	Event 3 (3)
Demographics	●		
Baseline Data Initial Visit	●		
Follow-Up Visit	●	●	●
Summary	●		

Creating a Project continued

Classic Project

Each data collection instrument can only be administered once to a participant

Can include surveys

Calculations and piping expressions use simplified syntax

All data for a participant is exported as a single record

Arms not supported

Longitudinal Project

Each data collection instrument can be administered multiple times at events

Can include surveys

Calculations and piping expressions use more complex syntax

Data for a participant is exported in multiple records

Project may have multiple arms



Creating a Project continued

Create a new project by clicking on “ + New Project” as shown below



+ Create a new REDCap Project

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

Project title:

Project's purpose: How will it be used?

Project notes (optional): Description of the project's use or purpose (displayed on the My Projects page)

Project creation option:

- Empty project (blank slate)
- Upload a REDCap project XML file (CDISC ODM form)
- Use a template (choose one below)

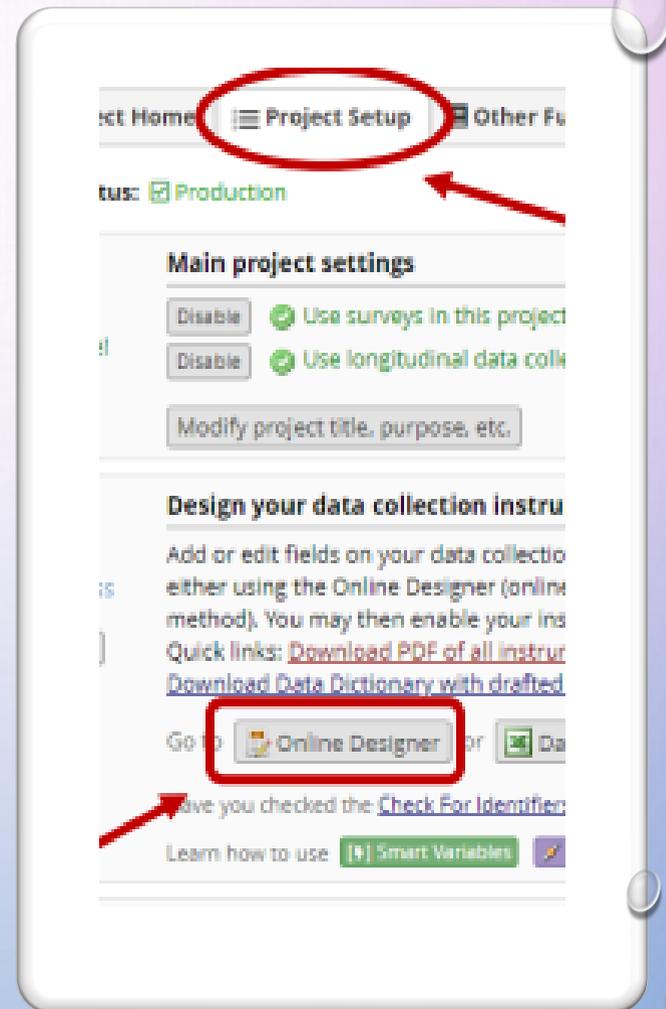
★ Choose a project template

<small>select template</small>	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 collecting monthly data forms, and concludes with a completion form.
<input type="radio"/>	Field Embedding Example Project	Contains a single data collection instrument to demonstrate how to embed a form in a field.
<input type="radio"/>	Human Cancer Tissue Biobank	Contains five data entry forms for collecting and tracking information for a human cancer tissue biobank.
<input type="radio"/>	Longitudinal Database (1 arm)	Contains nine data entry forms (beginning with a data collection instrument) longitudinally over eight different events.
<input type="radio"/>	Longitudinal Database (2 arms)	Contains nine data entry forms (beginning with a data collection instrument) longitudinally over eight different events, with two different arms (Drug A and Drug B) with each event.

- Select “Practice/Just for fun” as the purpose of the project
- Select “Create an empty project (blank state)”
- Click “create Project”

Creating a Project continued

- ❑ Select “Project Setup” from the main menu tabs
- ❑ Click “Online Designer” to start customizing your project



The screenshot shows a web interface for project setup. At the top, there are three main menu tabs: "Project Home", "Project Setup", and "Other Fu...". The "Project Setup" tab is circled in red, and a red arrow points to it from the right. Below the tabs, the status is set to "Production" with a green checkmark. The "Main project settings" section includes two "Disable" buttons, each followed by a green checkmark and the text "Use surveys in this project" and "Use longitudinal data colle...". Below this is a button labeled "Modify project title, purpose, etc.". The "Design your data collection instru..." section contains text about using the Online Designer and two quick links: "Download PDF of all instrur..." and "Download Data Dictionary with drafted...". At the bottom of this section, there is a "Go to" button labeled "Online Designer" with a red icon, which is circled in red. A red arrow points to this button from the left. To the right of the "Online Designer" button is another button labeled "Da...". Below the "Go to" buttons, there is a question "Have you checked the [Check For Identifier](#):" and a link "Learn how to use [Smart Variables](#)".

Creating a Project continued

Create New instruments in the project

Data Collection Instruments

Add new instrument:

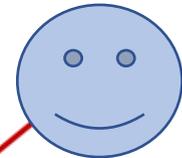
- Create** a new instrument from scratch
- Import** a new instrument from the official [REDCap Shared Library](#) ?
- Upload** instrument ZIP file from another project/user or [external libraries](#) ?

Instrument name	Fields	View PDF	Instrument actions
Eligibility Questionnaire	2		Choose action ▾
Pediatric Asthma Caregiver's Quality of Life Questionnaire	0		Choose action ▾

Hint: Create an additional instrument to include both forms to this practice project.

User Rights

User Rights Tool: To add another user to your project



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

— OR —

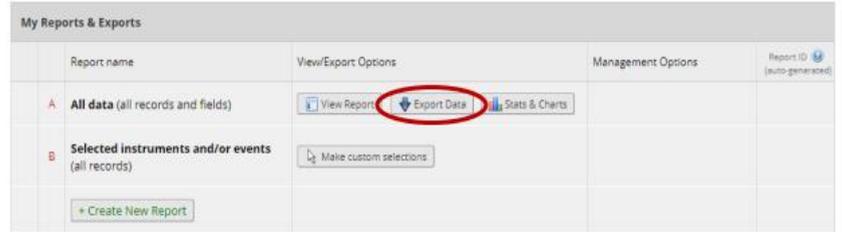
Create new roles: Add new user roles to which users may be assigned.

Data Export

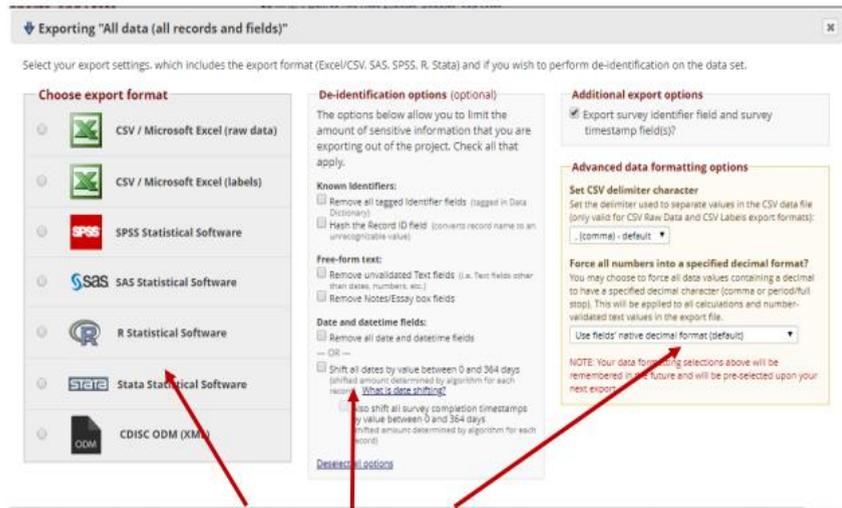


Applications

- Calendar
- Data Exports, Reports, and Stats**
- Data Import Tool
- Data Comparison Tool
- Logging
- Field Comment Log
- File Repository
- User Rights and DAGs
- Record Locking Customization



	Report name	View/Export Options	Management Options	Report ID (auto-generated)
A	All data (all records and fields)	<input type="button" value="View Report"/> <input checked="" type="button" value="Export Data"/> <input type="button" value="Stats & Charts"/>		
B	Selected instruments and/or events (all records)	<input type="button" value="Make custom selections"/>		



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
- 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)

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):

[comma] - default

Force all numbers into a specified decimal format?

You may choose to force all data 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.

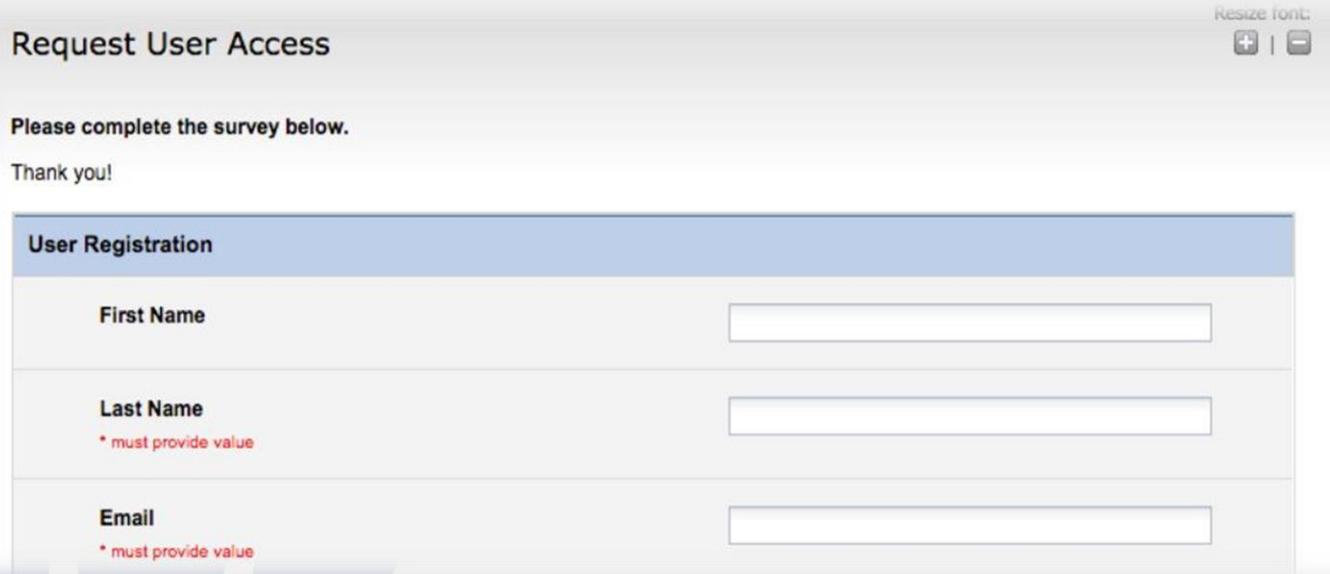
Use fields' native decimal format (default)

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

You can export data in many different ways. Please take a few minutes to look at the type of formats you can export your data, de-identification options and advanced data formatting options.

What is a REDCap Survey?

In REDCap, a survey is a version of a data form that is completed by a study participant without logging into the REDCap system



The screenshot shows a web browser window titled "Request User Access". In the top right corner, there is a "Resize font:" control with plus and minus icons. Below the title, the text reads "Please complete the survey below." followed by "Thank you!". The main content is a form with a blue header bar labeled "User Registration". The form contains three input fields: "First Name", "Last Name", and "Email". The "Last Name" and "Email" fields have a red asterisk and the text "* must provide value" below them. The "First Name" field does not have a red asterisk.

Creating a Survey

1. Within the Project Setup Checklist make sure your project is enabled for surveys



Main project settings

Not started

I'm done!

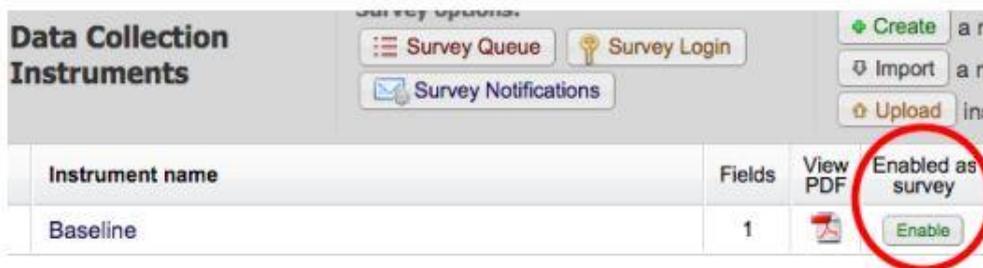
Enable Use longitudinal data collection with repeating forms?

Enable Use surveys in this project? ?

VIDEO: How

Modify project title, purpose, etc.

2. Create the data form
3. Enable the data form as a survey within Online Designer



Data Collection Instruments

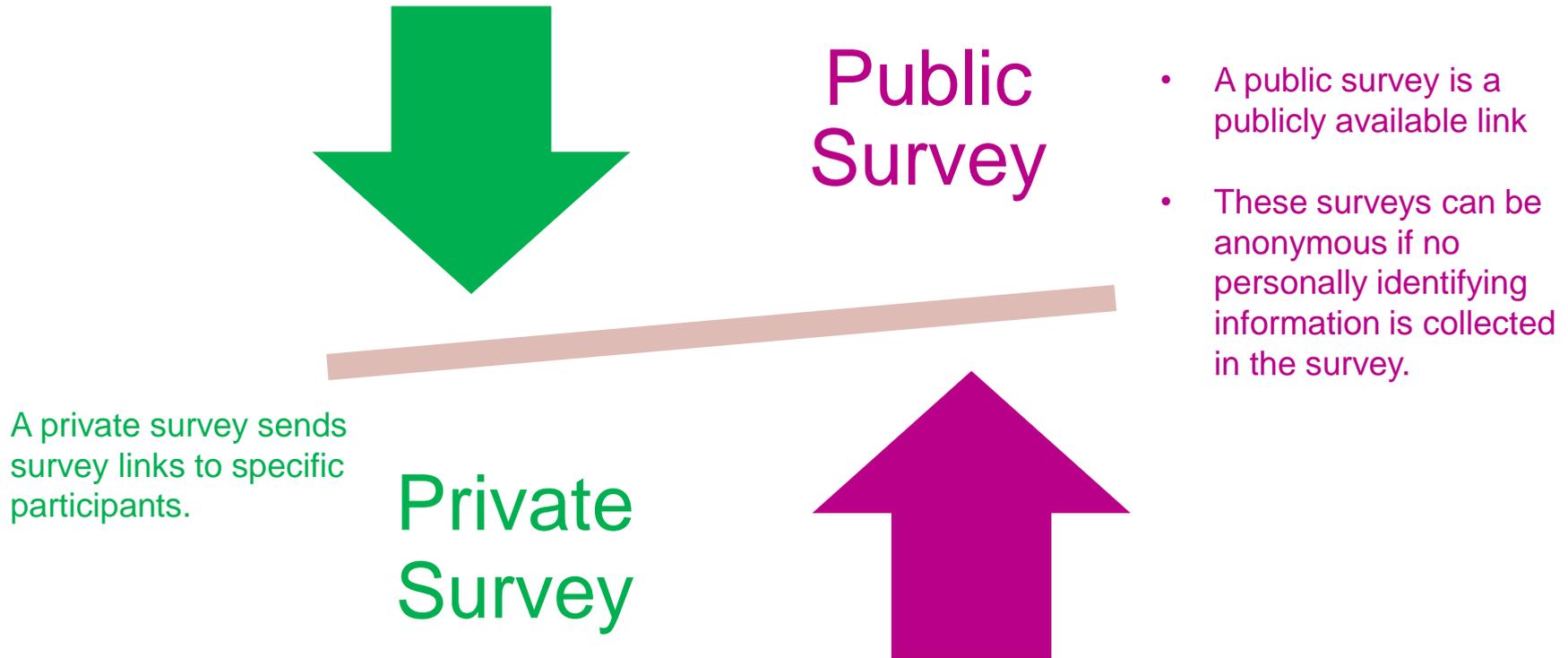
Survey Queue Survey Login Survey Notifications

Create Import Upload

Instrument name	Fields	View PDF	Enabled as survey
Baseline	1		Enable

Distribution of a survey

There are two types of Survey links you can use in REDCap:



Distribution of a survey

Public Survey: In the public survey option, REDCap generates a link that can be posted online or emailed to potential participants. Anyone can click this link any number of times, and REDCap auto-numbers the responses. There is no way to know who responded to a public survey unless you ask for identifiers in your survey, such as name or email address.

The screenshot shows the REDCap interface for a public survey. At the top, there are three navigation tabs: "Public Survey Link" (highlighted with a red box), "Participant List", and "Survey Invitation Log". Below the tabs, a text block explains that using a public survey link is the simplest and fastest way to collect responses, but notes that responses are anonymous and the link can be used multiple times. A "Public Survey URL" field contains the text "https://redcap.uchicago.edu/surveys/?s=DF8FKXHHW3". Below the URL field are two columns of buttons: "Link Actions" (Open public survey, Open public survey + Log out, Send me URL via email, Survey Access Code or QR Code) and "Link Customizations" (Get Short Survey Link, Create Custom Survey Link, Get Embed Code).

- Simplest
- Fastest

Distribution of a survey

Private Survey: To send out a private survey, REDCap generates a unique survey link for each participant. This requires that you have each participant's email address, unless you will be opening the survey for the participant (if they are taking the survey in person).

Through Participant List: Allows for emailing the survey to your participants, and keeping track of responses

Public Survey Link **Participant List** Survey Invitation Log

The Participant List option allows you to **send a customized email** to anyone in your list and **track who responds to your survey**. It is also possible to identify an individual's survey answers, if desired, by providing an Identifier for each participant (this feature must first be enabled by clicking the 'Enable' button in the table below). Note: All survey responses collected are considered anonymous unless you 1) are using Participant Identifiers or 2) have enabled the designated email field for invitations. [More details](#)

Participant List belonging to [Initial survey] "Screening" ▼ Remove all participants

Displaying 1 - 2 ▼ of 2 Add participants Compose Survey Invitations Export list

Email	Record	Participant Identifier Enable	Responded?	Invitation Scheduled?	Invitation Sent?	Link	Survey Access Code and QR Code	
jane.doe@email.com		Disabled		-				remove
john.doe@email.com		Disabled		-				remove



Distribution of a survey

Testing is CRITICAL!

- ❖ To test your survey, send a link to yourself in the same method as you plan to send a link to a respondent.
- ❖ Take your survey a few times to make sure the instructions, format, and termination options work as needed.
- ❖ Export test data to check data analysis, and modify survey questions if needed.
- ❖ Once testing is complete, request the project be moved to production.
- ❖ DO NOT send out survey until then!



Distribution of a survey

The Public Survey Link may be the easiest way to promote your survey. The attributes of this survey type are:

1. Responses are anonymous (unless the survey contains identifying questions).
2. All participants access the same URL.
3. The same participant may take the survey multiple times.
4. There is no way to monitor responses as you have no way to tell who did or did not fill out the survey(s).

The Private Survey Link offers the greatest control over the survey responses. The attributes of this survey type are:

1. Responses are anonymous (unless the survey contains identifying questions).
2. A unique URL is generated for each participant.
3. Each participant may respond to the survey only once.
4. You can send directly to your target audience.
5. You may view the status of each survey via the Survey Invitation log.

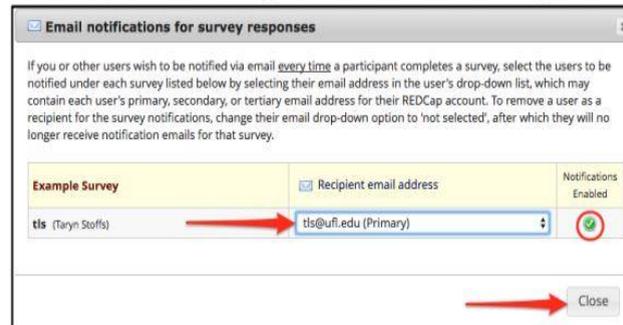
Distribution of a survey

Go to the *Online Designer* page and click on 'Survey Notifications.'

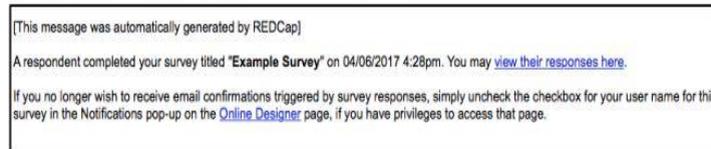


A list of all project users and their email addresses will be listed here. To select who gets the survey notification emails, select their email address under the *Recipient email address* column. Once enabled, there will be a green checkmark under *Notifications Enabled* column.

➤ How to get notified when a survey has been submitted:



Example email from a survey notification:



Surveys vs. Data Forms

Surveys:

- ❖ Do not require participant login; data entry is performed by participant
- ❖ Can be used for anonymous or personalized data collection
- ❖ All completed surveys have a date and timestamp that can be included in reports and exports
- ❖ Easier to enter responses from a smartphone or tablet
- ❖ Sleek interface that can be customized with logos and instructions
- ❖ Configurable automated reminders for participants to complete survey(s)
- ❖ Optional notification when survey is completed

Surveys vs. Data Forms

Data Collection Forms:

- ❖ User must be an authorized REDCap user; data entry is performed by study staff
- ❖ Each user must be granted access by the project owner
- ❖ Users entering data have the ability to see all data they've previously entered, edit previous responses, or check for updates
- ❖ Data entry is audited
- ❖ Users have the ability to give a form a status, marking it as "complete" or "incomplete" depending on what is most useful for workflow

How to get REDCap Access?

- ❖ REDCap is not an open resource
- ❖ Contact your local organisation's REDCap administrator
- ❖ At Central Coast LHD
 - ✓ CCLHD REDCap Server
 - ✓ REDCap server with OHMR, Ministry of Health

Why use REDCap?

Secure storage of data

Collect quality data

Supports all stages of data lifecycle

Export to statistical packages

Reduce the risk of data breaches

Developed by researchers for researchers



Comply with governance requirements

Ongoing system development

Real-time

Online consent

Access from anywhere

Supports different study designs

Generate reports

Comply with ethical requirements

Extensive functionality

Project Management / Operations

Secure data/file transfer

Collaborate



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