



## Advanced User Guide

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This guide was created using the documents available for REDCap Administrators:

- Vanderbilt REDCap Training Materials website:  
<https://redcap.vanderbilt.edu/plugins/redcapconsortium/trainingmaterials.php>
- REDCap Help & FAQ tab in software
- REDCap software

## REDCap Advanced Topics

**Prerequisite for Advanced Class** In order to be prepared for this class:

- You should have already completed the Intermediate Training Class
- Know how to navigate around REDCap
- Be knowledgeable of REDCap's functionality

### REDCap Glossary

**Arms:** group events into 'arms'; there may be one or more arms/groups per project. Each arm can have as many events as needed. Used in Longitudinal projects.

**Data Dictionary:** is a specifically formatted CSV (comma delimited) file within which you may construct your project fields and afterward upload the file to commit the changes to your project. That structure controls the content and functionality of webpages during data entry.

**Double Data Entry:** allows two project users to create and edit fields of the same record without seeing one another's data. The double data entry is then checked by a Reviewer then merged into a single entry. This tool is used as a data entry quality control method.

**Event:** allows for the utilization of data collection forms multiple times for any given project record (used when collecting longitudinal data). An 'event' may be a temporal event in the course of a project, such as a participant visit or a task to be performed.

**Field/Variable Names:** are a keyword or short phrase describing what kind of data will be captured in the field. Names must be unique within the project. They also must use only lowercase letters, numerals, and the underscore character. The field/variable name will not be displayed on instruments and is not used during common daily project operations.

**Longitudinal Model:** this model is designed so that data collection instruments may be used multiple times for any give record/patient so that data for the same fields may be captured over and over again, longitudinally. This model allows users to define events that will be used for the data collection and associated data collection instruments with those events.

**Randomization:** is a process that assigns participants/subjects by chance (rather than by choice) into specific groups, typically for clinical research and clinical trials.

**Record Status Dashboard:** a table that lists all existing records and their status for every data collection instrument. The table uses color-coded icons; Red – Incomplete; Yellow—Unverified; Green—Complete; Grey—Incomplete (no data saved); Orange Check—Partial Survey Response; Green Check—Completed Survey Response.

**SQL:** is a standardized query language for requesting information from a database used in programming.

## HIPAA Compliance and PHI

The HIPAA Security Rule defines the standards, which require covered entities to implement basic safeguards to protect electronic protected health information (EPHI), which is individually identifiable health information in the electronic form. **Privacy depends upon security measures: no security, no privacy.**

HIPAA also mandates that covered entities must maintain reasonable and appropriate administrative, physical, and technical safeguards to protect patients' electronic protected health information. This information may be in any electronic format that is stored or transmitted from devices such as desktop or laptop computers, networked systems, disks, CD-ROMs, hand-held device (PDAs), and other clinical-related devices.

Always think about the security of your data—only export when necessary. Take precaution when exporting data and only export data if you need to run reports or analysis outside of REDCap. Limit user privileges to allow export rights only to those who really need it. **Note:** REDCap is a web-based system. Once data is downloaded from REDCap to a device (ex: computer, laptop, mobile device), the user is responsible for that data. If the data being downloaded is protected health information (PHI), the user must be trained and knowledgeable as to which devices are secure and in compliance with ECU's standards (ex: HIPAA) for securing PHI.

Use the REDCap Send-It feature to send data—Send-It is a secure data transfer application that allows you to upload a file (up to 32MB in size) and then allow multiple recipients to download the file in a secure manner. Each recipient will receive an email containing a unique download URL, along with a second follow-up email with the password (for greater security) for downloading the file. The file will be stored securely and then later removed from the server after the specified expiration date. Send-It is the perfect solution for anyone wanting to send files that are too large for email attachments or that contain sensitive data.

At ECU, we are committed to protecting our patients' privacy and maintaining our organization's security of information. We continue to comply with the HIPAA rule and maintain the confidentiality, security, and integrity of our patients' health information. **Note:** If you have a question about HIPAA or wish to report a privacy concern, please call: 744-5200 or [email: HEALTHCAREPRIVACY@ecu.edu](mailto:HEALTHCAREPRIVACY@ecu.edu).

## PHI Identifiers

There are 18 pieces of information that are considered identifiers (also called protected health information, or PHI) for the purposes of HIPAA compliance. When you indicate a variable as an Identifier, you have the option to **"de-identify" your data on data exports**. In the Data Export Tool, the identifier variables appear in red and there are de-identification options you can select prior to exporting the data.

The 18 HIPAA Identifiers are:

- Name
- Fax number
- Phone number
- Email address
- Account numbers
- Social Security number (**not allowed in REDCap**)
- Medical Record number
- Health Plan number
- Certificate/License number
- URL
- IP address
- Vehicle identifiers
- Device ID
- Biometric ID
- Full face/identifying photo

- Other unique identifying number, characteristic, or code
- Postal address (geographic subdivisions smaller than state)
- Date precision beyond year

## REDCap and Your PHI

It is imperative that REDCap users who store Protected Health Information (PHI) do so in a responsible way. REDCap is HIPAA compliant in that it provides the means to limit who has access to the PHI you enter into your project, but there are some things you have to do yourself.

**Identify the variables that contain your PHI to REDCap.** When you add a new field in your project, make sure you select “Yes” in the “Identifier?” property. Do this for all your fields containing PHI. This way REDCap will know what data to limit to those who only have the clearance to see de-identified data.

**Set up your User Rights to control who has access to your PHI.** The “User Rights” module is where you define who has access to what data. You can set a user's permissions to include either a full data set or a de-identified data set. Users can also be granted or denied access to specific instruments in your project. If your project contains PHI, it is imperative to limit who has access to that information in your project.

**Be cognizant of your downloaded record sets.** In REDCap it is easy to download a full set of data, including PHI, if you have the permissions. Because of that convenience, it would be easy to download a set to your desktop, view the data, and then leave it, forgetting it's there, even past its usefulness. (This is just one example meant to serve as a possible scenario.) These “forgotten” record sets could get into the wrong hands if left, unprotected or forgotten. They are especially vulnerable on laptops, tablets, mobile phones and USB drives that are even more susceptible to loss or theft. Your mobile devices must be encrypted if you are using them to store PHI. Better yet, don't store sensitive data on them at all.

**Always be mindful of PHI, however you use it.** Even if you never export identified data from REDCap, if you have it displayed on your computer monitor, or write it down on a piece of paper that ends up on your desk, you are potentially exposing that data to individuals without authorization to view it. Consider using a screening device on your computer monitor to shield your data from casual visitors and make sure you shred any pieces of paper you have used to quickly jot down a name and phone number, or any other PHI.

## How to Use Piping

The “Piping” feature in REDCap allows you to inject previously collected data into text on a data collection form or survey. This provides great precision and control over question wording. It can also be used in other ways, such as customizing survey invitations (Ex: by including the respondent's name in the email) or survey completion text (Ex: thanking your respondent by name after completing a survey).

### Where Can Piping be Used?

Piping can be used in many different places in REDCap. Here is a list of all the places where piping can be used to insert a data value \*INTO\* text.

- Field Label
- Field Note
- Section Header
- Matrix field column headers
- Option labels for multiple choice fields (radio, drop-down, checkbox)
- Slider field labels (Ex: text displayed above slider bar)
- Custom record locking text (if defined, displayed at bottom of form)
- Survey instructions
- Survey Completion Text

- Survey invitation emails (sent via Participant List or Automated invitations) – includes both subject and message
- Custom text displayed at top of Survey Queue
- Inside the URL for a survey's "**Redirect to a URL**" setting

## From What Field Types Can Data be Piped?

Data can be piped into the locations listed above \*FROM\* any type of field in REDCap with the exception of:

- Checkbox fields
- File Upload fields.

If you are piping the answer \*FROM\* a multiple-choice field (radio, drop-down), it will display the option label (not the coded data value) into the location where the field is piped, but for all other field types, it will pipe the literal data value.

## How Do I Utilize Piping?

Setting up piping is very simple. Piping does not have to be enabled in any way in order to use it. **All you need to do to pipe a data value into any of the valid places is insert into your text the variable name inside square brackets.** For example, if we have a survey question that asks "**What is your first name?**", in which the variable name for that question is "**first\_name**", then the following question may be setup as "**[first\_name], what is your date of birth?**". If the user entered "**John**" as their first name, then text for the next question would literally read as "**John, what is your date of birth?**". In the same way, you could use [first\_name] in your survey's survey completion text when the survey is completed, in which "**Thanks for taking our survey, [first\_name]!**" would be displayed to the respondent as "**Thanks for taking our survey, John!**".

If you are piping the answer \*FROM\* a multiple-choice field (radio, drop-down), it will display the option label (not the coded data value) into the location where the field is piped. For example, if you had a drop-down question that said "What is your favorite ice cream?" with the choices "Chocolate", "Vanilla", and "Strawberry" (all coded at 0, 1, 2, respectively); then after selecting "Chocolate", the next question would read "On a scale of 1 to 10, how much do you like Chocolate?. But for non-multiple-choice fields, such as Text Notes, Slider fields, it will pipe the literal data value.

If you have a longitudinal project, you may utilize cross-event Piping if you wish. In the same way that cross-event calculation and branching logic are set up, you simply prepend the variable name inside square brackets with the unique event name inside square brackets. For example, if you collected a person's first name on the event named "Enrollment", which as the unique event name "enrollment\_arm\_1", then you could set up piping as "**[enrollment\_arm\_1][first\_name], what is your date of birth?**". Thus, it will pipe the first name value only from the "Enrollment" event and not any other event, whereas **if the unique event name is not prepended to a variable in the longitudinal project, it will pipe the data value from the current event.**

## Example 1

Setup:

Variable: ice\_cream

What is your favorite ice cream?

Chocolate  
 Vanilla  
 Strawberry

reset

Add Field Add Matrix of Fields

Variable: slider

Hate it Indifferent I love [ice\_cream]!

How much do you love [ice\_cream] ice cream?

Click bar above and then drag to set response

reset

Before:

What is your favorite ice cream?

Chocolate  
 Vanilla  
 Strawberry

reset

How much do you love \_\_\_\_\_ ice cream?

Hate it Indifferent I love \_\_\_\_\_!

Click bar above and then drag to set response

After:

What is your favorite ice cream?

Chocolate  
 Vanilla  
 Strawberry

reset

How much do you love Chocolate ice cream?

Hate it Indifferent I love Chocolate!

Click bar above and then drag to set response

## Example 2

Setup:

Survey Termination Options:

Redirect to a URL  
(Redirect to a webpage when survey is completed)

Provide a full URL, e.g. http://www.example.com/mypage.html

— OR —

Survey Acknowledgement Text  
(Displayed after survey is completed)

[first\_name], thank you for taking the survey.  
Have a nice day!

Before:

What is your first name?

John

After:

Close survey

John, thank you for taking the survey.  
Have a nice day!

## Create Additional Arms

In a Longitudinal project, you can group your events into “arms”. You may have one or more arms/groups for your project. Each arm can have as many events as needed. To create additional “arms”, navigate to the “Define My Events” button. On the tabs, you will see a “+Add New Arm” tab.



Upload or download arms/events

Arm 1: Flavors | Arm 2: Treats | Arm 3: Toppings | **+Add New Arm**

Arm name: **Flavors** [Rename Arm 1](#) | [Delete Arm 1](#)

Click on the “+Add New Arm” button to add a new arm to your project. You will enter the “arm name” in the text box and click on the “Save” button. REDCap automatically assigns the “arm number”.



Upload or download arms/events

Arm 1: Flavors | Arm 2: Treats | Arm 3: Toppings | **+Add New Arm**

Arm name: **Cones** Arm number: **4**

**Save** Cancel

## Add Events

After creating the arm, you will need to add events to the arm.



Upload or download arms/events

Arm 1: Flavors | Arm 2: Treats | Arm 3: Toppings | Arm 4: Cones | **+Add New Arm**

Arm name: **Cones** [Rename Arm 4](#) | [Delete Arm 4](#)

Event #	Days Offset	Offset Range Min / Max	Event Name	Unique event name (auto-generated)
No events have been defined for this Arm				
Add new event	<input type="text"/> Days	<input type="text"/> - 0 <input type="text"/> + 0	<input type="text"/>	
	<small>Connect from Other Arms</small>		<small>Descriptive name for this event</small>	

## Upload Arms/Events

You can also add new arms to the project or update the arm name of any existing arms by uploading a CSV file with a new arms configuration. The format for the CSV uploaded file can be acquired by exporting the CSV file of your existing arms.



Upload or download arms/events

Arm 1: Flavors | Arm 2: Treats | Arm 3: Toppings | Arm 4: Cones | **+Add New Arm**

Arm name: **Cones** [Rename Arm 4](#) | [Delete Arm 4](#)

When you click on the “Upload or download arms/events” button, you will see a dropdown list of options.



Click on the “Download arms (CSV)” option to get the existing arms file.

arm_num	name
1	Flavors
2	Treats
3	Toppings

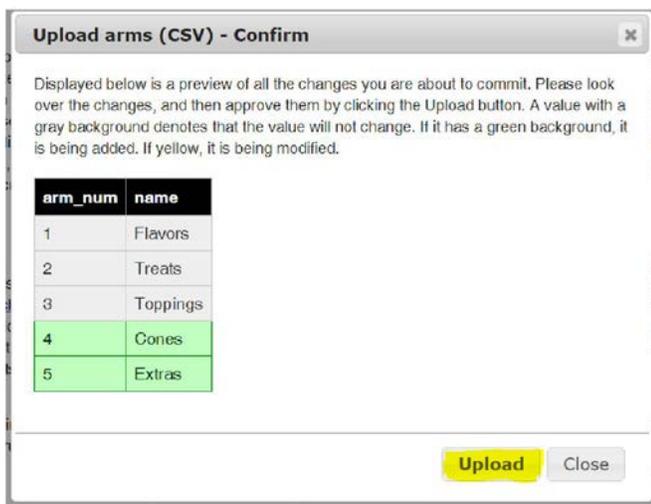
Now you can make the necessary additions/changes to the file. Arms can be renamed by simply changing the arm name in the CSV file. Arms cannot be deleted using the CSV file. You can see in the example, I have added two new arms.

arm_num	name
1	Flavors
2	Treats
3	Toppings
4	Cones
5	Extras

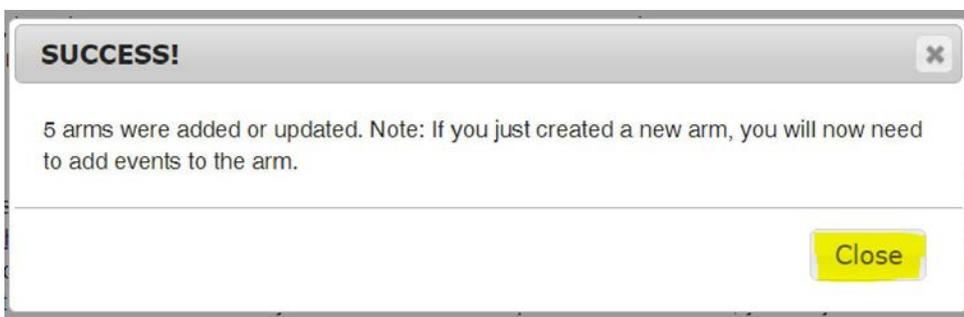
Now you are ready to upload the CSV arms file into REDCap. Click on the “Upload or download arms/events” and select “Upload arms”. You will then select your Arms CSV file from your computer and click on the “Upload” button.



After you click the “Upload” button, you will see the “Upload arms (CSV) – Confirm” screen. This screen will display a preview of all the changes you are about to make.



A value with a gray background denotes that the value will not change. If it has a green background, it is being added. If the background is yellow, it is being modified. Look over the changes and then approve them by clicking the “Upload” button.



After you click the “Upload” button, you will see a “Success!” box showing the number of arms that were added or updated. **Note:** If you just created a new arm, you will need to add events to the arm.

Arms can also be renamed by using the “Rename Arm” link for each arm. If you wish to delete an arm, you can do so using the “Delete Arm” link for each arm.



## Randomization Module

Randomization is a process that assigns participants/subjects by chance (rather than by choice) into specific groups, typically for clinical research and clinical trials. Randomization in REDCap works by allowing you to create your custom allocation list, which will serve as a lookup table for deciding how to randomize your subjects (Ex: records in your project). In this module, you first define the randomization model with various parameters. Based on the defined parameters, the module creates a template allocation table, which you can use to structure the randomization table you will import. The module also monitors the overall allocation progress and assignment of randomized subjects.

REDCap **does not** create the randomization table for you. This table must be generated outside of REDCap using other software (Ex: Excel, SAS, Stata, R), most likely by the statistician/data analyst involved in your project. By letting you create your own allocation table outside of REDCap, it lets you and your team choose exactly how you wish to structure your allocations and assignments (Ex: block sizes, permutations, and

stratification balancing).

**Note:** The “**Setup**” phase for randomization is **ONLY** available while the project is in development status, so the entire setup process should be completed before the project is moved to production status. Once the project is in project, the “**Setup**” tab will become permanently locked and no settings can be modified or can any assignments be undone.

## Goals of Randomization

- To produce groups that are comparable (Ex: balanced) with respect to known or unknown risk factors
- To remove bias (selection bias and accidental bias)
- To guarantee the validity of statistical tests
- To balance treatment groups, stratification factors, or both

## When to randomize?

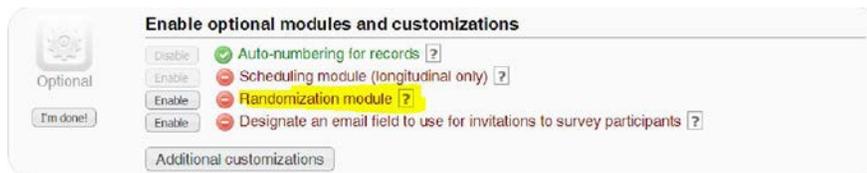
- As determining eligibility
- As close to treatment time as possible (to avoid withdrawal before treatment starts)

## User Privileges

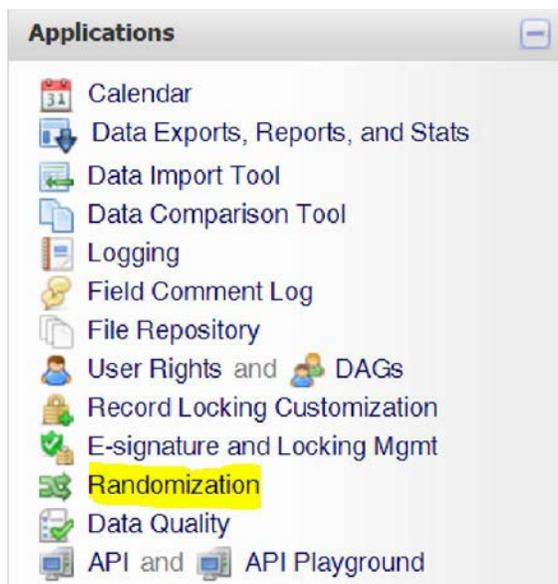
User privileges can be set to allow only certain users to be able to set up the randomization, perform the randomization, or view the allocation dashboard to view progress. If someone is given “**Randomize**” privileges, they will be able to view and modify any existing data already collected for the randomization strata fields (if stratification is used) when they are performing the randomization, even if they do not specifically have form-level rights to view the form on which a strata field exists. Thus Randomize rights trumps form-level rights in this way, but only for the randomization strata fields.

## Setting up a Randomization Model

A randomization model defines how the subjects in the study are randomized. To start the process, click on the “**Enable**” button beside the “**Randomization module**”.



Next, click on the “**Randomization**” link under “**Applications**” menu.



## Randomization Setup

The randomization model is defined on the “Setup” tab and consists of three main steps:

- Define your randomization model
- Download template allocation tables (as Excel/CSV files)
- Upload your allocation table (CSV file)

**Setup** Dashboard

---

**STEP 1: Define your randomization model**

This step will allow you to define the randomization model you will be implementing and all its parameters, which includes defining strata (if applicable) and optionally randomizing subjects per group/site (if a multi-site study).

**A) Use stratified randomization?**

It is often necessary to ensure equal treatment among a number of factors. Stratified randomization is the solution to achieve balance within one or more subgroups, such as gender, race, diabetics/non-diabetics, etc. By choosing strata (criteria fields), you may then be able to ensure balance within those subgroups. [Tell me more](#)

**B) Randomize by group/site?**

If this is a multi-center/multi-site project (or something similar), you may want to stratify the randomization by each group/site. You can select an existing multiple choice field that represents the groups/sites, OR you can use Data Access Groups to stratify by group/site.

**C) Choose your randomization field**  
This is the field where the allocated randomization (treatment) group will be saved and stored, and is where the Randomize button will appear on your data collection form.

- select a field - ▼ for Event 1 (Arm 1: Flavors) ▼

Save randomization model Erase randomization model

### Step 1: Define your randomization model

The first step in the setup process is to define your randomization model you will be implementing and all its parameters, which includes defining strata (if applicable) and optionally randomizing subjects per group/site (if a multi-site study). In this step, you will define the type of randomization and how the randomization is applied to the subjects. There are two randomization types, use stratified randomization and randomize by group/site.

#### Use Stratified Randomization?

Stratified randomization ensures that different groups are balanced. The balance is specified in the allocation table. Increasing the number of stratification variables will lead to fewer subjects per stratum.

**STEP 1: Define your randomization model**

This step will allow you to define the randomization model you will be implementing and all its parameters, which includes defining strata (if applicable) and optionally randomizing subjects per group/site (if a multi-site study).

**A) Use stratified randomization?**

It is often necessary to ensure equal treatment among a number of factors. Stratified randomization is the solution to achieve balance within one or more subgroups, such as gender, race, diabetics/non-diabetics, etc. By choosing strata (criteria fields), you may then be able to ensure balance within those subgroups. [Tell me more](#)

**Choose strata** (criteria fields used for stratification; may specify up to 14 fields)

favorite (What is your favorite flavor of Ice Cream?)... ▼ for Event 1 (Arm 1: Flavors) ▼

Add another stratum

**Note:** You must revise the data dictionary to include the needed fields to specify the randomization model.

### B) Randomize by group/site?

If this is a multi-center/multi-site project (or something similar), you may want to stratify the randomization by each group/site. You can select an existing multiple choice field that represents the groups/sites, OR you can use Data Access Groups to stratify by group/site.

Use Data Access Groups to designate each group/site (1 groups currently exist)

Use an existing field to designate each group/site

- select a field - ▼ for ▼

### Randomization by group/site?

If this is a multiple site study, this option allows you to stratify the randomization by each group. When this option is checked, you are given the opportunity to select randomization by data access groups or by a REDCap drop-down list of sites.

### Choose your randomization field

This is the field that will receive the randomization group designation.

### C) Choose your randomization field

This is the field where the allocated randomization (treatment) group will be saved and stored, and is where the Randomize button will appear on your data collection form.

favorite (What is your favorite flavor of Ice Cream?)... ▼ for Event 1 (Arm 1: Flavors) ▼

Save randomization model

Erase randomization model

Once all parameters are set, click on the “Save randomization model” button.

### Step 2: Download template allocation tables (as Excel/CSV files)

The second step in the randomization setup is to download the allocation table template.

#### STEP 2: Download template allocation tables (as Excel/CSV files)

Below are some example files that you may download to get a general idea for how you may structure your own randomization table. You do not have to use any of these. In fact, **we recommend that you NOT use these exact templates** but instead recommend that you merely use them as an example or baseline to start from in order to create your own custom allocation file. After uploading your allocation table in Step 3 below, it will then be used as a lookup table to perform assignments when subjects are being randomized. **NOTE:** Record names (e.g., study ID) should NOT be included as a column in your allocation table, but only the fields listed in the example files below. [More details](#)

Example #1 (basic)

Example #2 (all possible combos)

Example #3 (5x all possible combos)

The template allocation tables will contain all the raw coded values for the fields used in your randomization model. When downloading and opening any of the template allocation tables, you will find some helpful notes in the last column of each file.

- It will list each multiple-choice option's label corresponding to each raw coded value for all the fields utilized (Ex: it will specify 0=Female and 1=Male for the field 'gender').
- If you are using Data Access Groups to randomize by group, then it will additionally list each group name with its corresponding group ID number, which can be used in your allocation table in the same fashion as the raw coded values for your randomization field and strata. The last column with the notes will be ignored when you finally upload your custom allocation table in Step 3.

REDCap creates three example files to download that you may use as a structure when creating your own randomization table.

**Note:** It is recommended that you **NOT** use these exact templates but instead recommend that you use them as an example or baseline to start from in order to create your own custom allocation file. In the following example, I have stratified a favorite ice cream field that has five different values and I wish to allocate the participants into five groups. My allocation template downloaded from REDCap looks similar to the

following:

favorite_ice_cream	favorite
1	1
2	1
3	1
4	1
5	1
1	2
2	2
3	2
4	2
5	2
1	3
2	3
3	3
4	3
5	3
...	...

1=Chocolate, 2=Strawberry, 3=Vanilla, 4=Butter Pecan, and 5=Mint Chocolate Chip

**Note:** Make sure the number of entries in the randomization table is large enough to accommodate all participants in each category. (Ex: We have 5 flavors of ice cream, so we need 5 entries for each group)

REDCap will randomize the participants according to this table. For example, the first participant that has a favorite ice cream flavor of “Chocolate” (corresponding to the value of 1) will be allocated to random group 1. The second participant with “Chocolate” will be allocated to random group 2, etc.

In order to make the allocation schedule more difficult to predict, a temporary column can be added to the spreadsheet for randomizing the order. The Excel function “Rand()” creates a random value between 0 and 1. This number can be used as an easy way to populate a third column in the spreadsheet with a unique random value. If the spreadsheet is sorted by this column, the group and favorite ice cream values will be randomized. For example, after sorting, the spreadsheet may look similar to the following:

favorite_ice_cream	favorite	Random Value
5	3	0.23170397
1	2	0.024421842
3	1	0.171568138
5	2	0.347883158
3	3	0.03699429
4	2	0.798562901
2	1	0.484903058
2	3	0.441132784
4	3	0.142003339
4	1	0.998495456
1	1	0.155816481
2	2	0.445958823
5	1	0.224797602
3	2	0.288672659
1	3	0.621979525
...	...	...

After sorting the table the random value, the column with the Rand() function should be removed before saving the spreadsheet as a CSV file and prior to uploading it as the allocation table into REDCap.

### Step 3: Upload your allocation table (CSV file)

**STEP 3: Upload your allocation table (CSV file)**

Once you have created your custom allocation table as a CSV file and made sure that you kept the format prescribed in the template files from Step 2 above, you may now upload the file below. It will be checked for any possible errors first before it is accepted and stored in REDCap. Please note that you will need to create two different allocation tables: one to be used for testing while your project is in development status and the other for use when in production status. Below are some important reminders before you begin uploading your allocation tables.

**Reminders:**

- Once your project is in production status, the allocation tables will become locked and unmodifiable.
- Be sure to include more assignments in your allocation table than you think you will need (to accommodate possible drop-out and drop-in of subjects).
- Record names (e.g., study ID) should NOT be included as a column in your allocation table, but only the fields listed in the example files from Step 2 above.

---

 **Upload allocation table (CSV file) for use in DEVELOPMENT status**  
[Delete allocation table?](#)

Already uploaded

---

 **Upload allocation table (CSV file) for use in PRODUCTION status**  
 No file chosen

Not uploaded yet

The third and final step in the randomization setup is to upload the allocation table. Two allocation tables will eventually need to be defined, one for the development stage and a different one for the production stage.

**Note:** These should **NOT** be the same allocation table.

### Randomization User Privileges

There are several user privileges that can be utilized for randomization, all of which correspond to different roles during the randomization process and can be set on the “**User Rights**” page.

- **Setup:** will see the “**Setup**” tab on the “**Randomization**” page, which will allow you to fine the randomization model and all its parameters, as well as upload your custom allocation table. (Should be the Statistician/Data Analyst)
- **Dashboard:** will see the (Allocation) “**Dashboard**” tab on the “**Randomization**” page, in which you may view the overall allocation progress and assignments for subjects that have been randomized. (Should be the PI)
- **Randomize:** will be able to view the “**Randomize**” button on the data collection form that contains the randomization field, thus allowing you to perform the randomization on the subject/record you are viewing. (Should be Study Coordinator)

 **Randomization**  
[What is randomization?](#)

Setup  
 Dashboard  
 Randomize

### Randomizing a Record

The fields that have been specified for randomization will not display a “**Randomize**” button in the data entry screen. This will allow you to generate a random value according to the randomization allocation table.

What is your favorite flavor of Ice Cream?



Randomize

When a user (who has been given appropriate “**Randomize**” user privileges) clicks that button, a pop-up box will appear that will allow the user to randomize the subject/record. If any grouping or stratification is being used, the user must provide the group or strata values if any are missing before they can randomize the subject/record. Pressing the “**Randomize**” button give you an opportunity to double check the required values that will impact the definition of the resulting randomization group.

Randomizing Record ID "11"



Below you may perform randomization for Record ID "11" on the field **What is your favorite flavor of Ice Cream?** (*favorite\_ice\_cream*). Please note that the fields below will become permanently locked and uneditable on the data entry form once this record has been randomized.

Provide any missing values below for Record ID 11, then click the Randomize button below.

What is your favorite flavor of Ice Cream?

Butter Pecan



**REMINDER:** This project is still in development status, so you should NOT be randomizing real subjects yet. You should only be randomizing real subjects after moving the project into in production status.

Randomize

Cancel

When the user randomizes the subject/record, REDCap will check the allocation table and assign that subject’s/record’s randomization field value, which will be derived from the next match in the table based upon the criteria (Ex: strata field values, group). If not using stratified randomization and not randomizing by group/site, then it will simply project the subject with the very next value in the allocation table. After updating or providing missing values, a dialog of the random group that was assigned is displayed.

Randomizing Record ID "11"



Record ID "11" was randomized for the field "What is your favorite flavor of Ice Cream?" and assigned the value "Strawberry" (2).

Close

In addition, after the value of the random group is assigned, the random group field becomes read-only and the value cannot be changed.

What is your favorite flavor of Ice Cream?



Butter Pecan



Already randomized

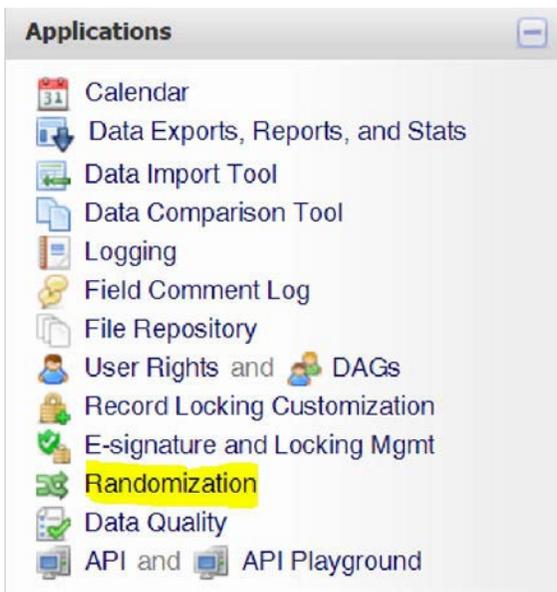
The strata field you have chosen also become read-only and cannot be changed.

What is your favorite flavor of Ice Cream?



- Chocolate
- Strawberry
- Vanilla
- Butter Pecan
- Mint Chocolate Chip

A listing of the records that have been randomized is maintained. To examine those records, click on the “**Randomization**” link in the “**Applications**” section of the Navigation Pane.



### Dashboard

A dashboard displaying the allocated records and the random group assigned are shown below:



The table below displays the allocation dashboard for use in DEVELOPMENT status. All assignments are grouped to show in aggregate the count of records that have been randomized for each row (i.e. combinations). Assignments that have been used will get counted in the 'Used' column while those that are still unallocated will get counted in the 'Not Used' column. Once all assignments have been used for a given row/combination, it will display a checkmark icon in its row. The headers in the table may be clicked to sort the table by that column either in ascending or descending order.

	Used	Not Used	Allocated records	What is your favorite flavor of Ice Cr... (favorite_ice_cream)	What is your favorite flavor of Ice Cr... (favorite)
<input type="radio"/>	0	1		Chocolate (1)	Chocolate (1)
<input type="radio"/>	0	1		Chocolate (1)	Strawberry (2)
<input type="radio"/>	0	1		Chocolate (1)	Vanilla (3)
<input checked="" type="checkbox"/>	1	0	10	Chocolate (1)	Butter Pecan (4)
<input type="radio"/>	0	1		Chocolate (1)	Mint Chocolate Chip (5)
<input type="radio"/>	0	1		Strawberry (2)	Chocolate (1)
<input type="radio"/>	0	1		Strawberry (2)	Strawberry (2)
<input type="radio"/>	0	1		Strawberry (2)	Vanilla (3)
<input checked="" type="checkbox"/>	1	0	11	Strawberry (2)	Butter Pecan (4)
<input type="radio"/>	0	1		Strawberry (2)	Mint Chocolate Chip (5)
<input type="radio"/>	0	1		Vanilla (3)	Chocolate (1)
<input type="radio"/>	0	1		Vanilla (3)	Strawberry (2)
<input type="radio"/>	0	1		Vanilla (3)	Vanilla (3)
<input type="radio"/>	0	1		Vanilla (3)	Butter Pecan (4)
<input type="radio"/>	0	1		Vanilla (3)	Mint Chocolate Chip (5)
<input type="radio"/>	0	1		Butter Pecan (4)	Chocolate (1)
<input type="radio"/>	0	1		Butter Pecan (4)	Strawberry (2)
<input type="radio"/>	0	1		Butter Pecan (4)	Vanilla (3)
<input type="radio"/>	0	1		Butter Pecan (4)	Butter Pecan (4)
<input type="radio"/>	0	1		Butter Pecan (4)	Mint Chocolate Chip (5)

## Important Information about Randomization

- How you generate your allocation table should be formal, secure, reproducible, and unpredictable. This is best handled by a statistician, **NOT** the PI.
- Be sure to include more assignments in your allocation table than you think you will need (to accommodate possible drop-out and drop-in of subjects).
- The **“Setup”** tab on the **“Randomization”** page is **ONLY** available while the project is in Development status.
  - o Once the project is in Production, the **“Setup”** tab will become permanently locked and no settings can be modified or any assignments be undone.
- Practice the process of randomizing patients by uploading an allocation table while in Development status and creating dummy records.
  - o Delete the dummy records and upload the final allocation table before moving to Production status.

## Data Dictionary

The **“Data Dictionary”** module allows you to create new data collection instruments/surveys or edit existing ones. You can create your database fields either using the **“Online Designer”** or a **“Data Dictionary”** (Microsoft Excel spreadsheet). The **“Data Dictionary”** uses a spreadsheet to build instruments, and you can also customize the file and then upload it to make changes. We recommend using the **“Online Designer”** when you first begin using REDCap to get a feel for how it works, and also anytime you are making minor changes. In time, as you get more experience using REDCap, you might find it is easier to create a **“Data Dictionary”** in Excel, and upload it into REDCap, especially if you will be adding a large number of fields to your project. You will not have to create similar variables, individually as in the **“Online Designer”**, you can take advantage of using Excel’s copy/past functionality. To learn how to create a data dictionary in Excel, a demonstration file with coding examples can be downloaded from the **“Data Dictionary”** tab of any REDCap project.

 [VIDEO: How to use this page](#)

This module will allow you to create new data collection instruments/surveys or edit existing ones. Changes may be made by either using the **Online Designer** or **Upload Data Dictionary** (see tabs above), in which you may use either method or both. The Online Designer may help you get some initial fields/forms built quickly or to make quick edits, but using the Data Dictionary file may be more helpful if you will be adding a large number of fields for this project.

This module may be used for making changes to the project, such as adding new fields or modifying existing fields, by using an offline method called the Data Dictionary. The Data Dictionary is a specifically formatted CSV (comma delimited) file within which you may construct your project fields and afterward upload the file here to commit the changes to your project.

Click the 'Browse' or 'Choose File' button below to select the file on your computer, and upload it by clicking the 'Upload File' button. Once your file has been uploaded, changes will NOT immediately be made but will be displayed and checked for errors to ensure that all the formatting in your Data Dictionary is correct before official changes are made to the project.

#### Need some help?

If you wish to view an example of how your Data Dictionary may be formatted, you may download the [Data Dictionary demonstration file](#), or you may view the [Data Dictionary Tutorial Video \(10 min\)](#). For help setting up your Data Dictionary, you may also see the instructions listed on the [Help & FAQ](#).

#### Steps for making project changes:

- 1.) [Download the current Data Dictionary](#) 
- 2.) Edit the Data Dictionary (see the [Help & FAQ](#) for help)
- 3.) Upload the Data Dictionary using the form below
- 4.) The changes will be made to the project after the Data Dictionary has been checked for errors

#### Upload your Data Dictionary file (CSV file format only)

Format for min/max validation values for date and datetime fields:

No file chosen

## Data Dictionary Excel Spreadsheet Columns

A data dictionary is an Excel (CSV) spreadsheet that defines an entire project, this includes the forms and the fields/variables. A data dictionary does not define: events; surveys, survey queues & settings; project settings; user rights & data access groups; schedules; randomization; data quality rules; and reports. It is recommended to download a copy of the current data dictionary and store it as a local backup. There is a one-to-one relationship between the data dictionary and the REDCap project. Each question or field on every data collection instrument occupies a row in the spreadsheet. The order of fields and forms in the dictionary defines the order of their appearance in the project. The spreadsheet is downloaded, modified outside of REDCap, and then uploaded back into a REDCap project to change the project structure. The data dictionary is most helpful when using advanced field types such as calculated or matrix fields. It is also the fastest and easiest way to copy several fields at once. The data dictionary contains column headers describing what information to include in the cells.

This section will describe the function of each column in the data dictionary spreadsheet and whether or not it is required or optional.

**Note:** The term “Column” here refers to Excel spreadsheet data dictionary columns. Also, the terms “field” and “variable”, as used here, are essentially interchangeable. Both terms refer to a unique item of data to be collected and analyzed. “Field” is a database term, while “variable” is a data analysis term.

### Column A—Variable/Field Name Required

- Variable/Field names specify the variable name that will be used in reporting, data export, and data analysis. Used to store and reference that variable throughout the project. They are not displayed on the data entry form.
- **Note: The first variable on the first form must be the record identifier** (Ex: Participant ID) because it will be used by REDCap as a key variable linking forms for a particular record. The default field name is “Record\_ID”. Demographics is normally the first form, but this is not required.

- Field names may contain lowercase letters, numbers, and underscores, but no spaces or special characters.
- Field names should always start with a letter.
- Field names must be unique and cannot be repeated within a database, even in different forms.
- In general, variable names should be as short in length as possible while maintaining meaning to researchers. Remember, they do not need to be too descriptive because the description will be included in the Field Label. A common example is the use of “DOB” as a variable name, with the corresponding field label of “Date of Birth”.
- The recommended character length for a field name is 26 and the maximum is 100.
- When using the “**Online Designer**” REDCap automatically assigns a default field name based on the field label (if enabled). It is recommended that you double check the default field name and modify as necessary.
- **Note:** If you change a variable name in one place, you must change it everywhere it is used, (Ex: calculations, branching logic, and automated survey logic).
- **Note:** If you change a variable name, you will lose all data entered under the old variable name.

#### Column B—Form Name Required

- Form Names correspond to individual data entry forms in the project. The name of the form that a field lives in.
- Form Names must be lowercase letters, numbers, and underscores in the Excel spreadsheet, but will be displayed in REDCap with initial capitals. If your form name contains more than one word, connect the words with an underscore, such as “form\_name”. The underscore will appear as a space in REDCap.
- All variables in a form must be in adjacent rows in the data dictionary. For example, you cannot have a variable in row 6 be in the “demographics\_form”, a variable in row 7 be in the “first\_visit” form, and then a variable in row 8 back in the “demographics\_form”.
- Forms will appear in the data collection section of REDCap in the order they appear in the data dictionary.
- Variables within a form will appear in the order they appear in the data dictionary.

#### Column C—Section Header Optional

- Use a “Section Header” to break up the data entry form into sections. When rendered, any text included in the header information will show up as a preceding line of text – with a yellow background.
- Section Headers are used to visually separate items within a form, primarily to aid data entry. If you are entering data directly into REDCap while interviewing a study participant, you may also want to use Section Headers to display interview script between questions (Ex: to introduce a new topic).

#### Column D—Field Type Required

- Specifying the field type determines what types of responses are allowed and how they data entry area for that field will be displayed. You can only use the REDCap supported field types below:
- Field types include:
  - **Text Box** – for capturing free text. The text field type should have validation (Column H) whenever possible. If the validation is “integer” or “numeric”, you should also include the allowable minimum and maximum values (Columns I & J) when possible. The text field type can also have suggested choices in Column G.
  - **Notes Box** – for capturing free text. Although there is no limit to the number of characters you can store in either text or notes field types, there is a limit to the number of characters displayed on the data entry form for each field type. Text boxes display about 30 characters and notes boxes display about 300 characters.
  - **Calculated Field** – perform real-time calculations. Calculated variables display the result of a calculation based on responses to other variables. Data cannot be entered in calculated field. Any variable in the database can be used in the calculated field regardless of data entry form. For longitudinal projects, you may need to specify the event name as well.

- **Drop-down List** – drop-down list of choices. Use if there are a large number of choices and only one choice is allowed. Must also have response options (choices) defined in Column F.
- **Radio Buttons** – radio buttons for each choice. Use if there are a small number of choices and only one choice is allowed. Must also have response options (choices) defined in Column F.
- **Checkboxes** – multi-selectable checkboxes. Use if multiple choices are allowed. Must also have response options (choices) defined in Column F.
- **Yes-No** – radio buttons with yes and no options coded as No = 0 and Yes = 1.
- **True-False** – radio buttons with true and false options coded as False = 0 and True = 1.
- **Slider** – visual analogue scale. Slider labels can be specified in Column F and slider numbers can be turned on in Column H.
- **File Upload** – upload a document. This field type allows you to attach a document (Ex: signed consent form) to the record. Note: that the field repository of REDCap is used to upload a project document, not a record/subject document to the project (Ex: blank consent form or IRB protocol).
- **Descriptive Text** – text displayed with no data entry. Optional image/file attachment must be specified through the Online Designer.
- **Begin New Section** – section headers appear in yellow and can be optional descriptive text.

### Column E—Field Label Required

A “Field Label” (or variable label) is a word or phrase which should be more descriptive than the variable/field name. This is the text that will be displayed to the survey participant or data entry user (instead of the variable name). For example, the field name might be “dr\_address” while the field label would be “Please enter the primary care physician’s address”.

### Column F—Choices, Calculations, or Slider Labels

**Required** (if field type is dropdown, radio, checkbox, or calculation)

- All categorical field types (dropdown, radio, or checkbox) must specify response options associating numerical values with labels. All calculated fields must specify the equation to be calculated here.
- Choices using dropdown, radio or checkbox field types are stored as numerical values, but choices can be displayed as text in the data entry form. For dropdown, radio, or checkbox field types, this column is used to specify both what is displayed on the data entry form and what is stored in the database. For example, if “0, No | 1, Yes” is entered in Column F, “No” and “Yes” will be displayed on the data entry form and “0” and “1” will be stored in the database. The | is critical to separate options in the list. Numerical codes do not need to be consecutive and do not affect the order the text is displayed.
- All calculated field must specify the calculation here. Examples of calculation syntax can be found at the Help & FAQ link at the bottom of the left handle panel of any REDCap project screen.
- Optional slider field labels can be specified here. The slider field allows you to label three anchor points: left, middle, and right. An example might be “Strongly Disagree”, “Neutral”, and “Strongly Agree”. These labels would be defined in Column F as: Strongly Disagree | Neutral | Strongly Agree

### Column G—Field Note Optional

- “Field Notes” are used to provide information to assist in data entry. They are mainly used to supplement the Field Label information. The field note will allow you to add a short instruction to a variable. Examples are specifying the expected format of a validated field (Ex: phone number), or units (Ex: kg vs. lb).
- The Field Note is rendered just below the field input element and shows up in small blue text.

### Column H—Text Validation Type or Show Slider Number Optional

1. Specifies data validation type for “text box” field type. The type of validation of a text field

might have or if you want to display the numeric value behind a slider field.

2. An error message is displayed if any entry does not match the expected format and the entry is not saved to the database. In other words, the validation type is a hard validation.
3. Data validation types for “text box” fields are email, integer, letters only, MRN (10 digits), number, phone, and zip code. Remember, **SSN are not allowed** in REDCap! In addition, there are several date and time validation formats.

Date & Time Formats	Example
DATE_DMY	16-02-2016
DATE_MDY	02-16-2011
DATE_MY	02-2011
DATE_YMD	2011-02-16
DATETIME_DMY	16-02-2011 17:45
DATETIME_MDY	02-16-2011 17:45
DATETIME_YMD	2011-02-16 17:45
DATETIME_SECONDS_DMY	16-02-2011 17:45:23
DATETIME_SECONDS_MDY	02-16-2011 17:45:23
DATETIME_SECONDS_YMD	2011-02-16 17:45:23
TIME_HH:MM	17:45
TIME_MM:SS	45:23

4. For “slider” field types, specifies whether to display or hide the value (1-100) selected on the slider. An entry of “number” in this column will display the value.

#### Column I & J—Text Validation Min/Max

##### Optional

1. These two columns define a minimum and/or maximum value for a validated text variable. For text validation types of number, integer, or date, minimum and maximum acceptable values may be specified. You may use a min, max, neither, or both for each individual field.
2. An error message, including the acceptable range, is displayed if the entry is out of range. However, the entry is stored to the database regardless of whether or not the entry is out of range. In other words, the Min/Max validation is a soft validation.

#### Column K—Identifier?

##### *Optional*

1. Flags the field as an identifier or not. This does not have any effect on the data entry process but does impact the data export process. If any of the fields are a “Subject Identifier”, then place “Y” in the cell. If not, simply leave the cell blank.
2. Tagging fields as “Subject Identifiers” will prevent lower-level users from exporting data for these fields from the database, depending on user rights.
3. There are 18 pieces of information that **should always** be marked as identifiers in a REDCap data dictionary:
  1. Name
  2. Fax Number
  3. Phone Number
  4. Email Address
  5. Account Numbers
  6. Social Security Numbers (**Not allowed in REDCap**)
  7. Medical Record Number
  8. Health Plan Number
  9. Certificate/License Numbers
  10. URL
  11. IP Address

12. Vehicle Identifiers
13. Device ID
14. Biometric ID
15. Full Face/Identifying Photo
16. Other Unique Identifying Number, Characteristic, or Code
17. Postal Address (Geographic Subdivisions Smaller than State)
18. Date Precision Beyond Year

## Column L—Branching Logic

### *Optional*

“Branching Logic” can be applied to a field to specify whether or not it will be displayed, depending on values in other fields. For example, a question about favorite ice cream flavor can be designated to be displayed only if the subject chooses that they like ice cream. Syntax for branching logic can be found at the Help & FAQ link at the bottom of the left hand panel of any REDCap project screen.

## Column M—Required Field?

### *Optional*

- Makes a field required. This does have an effect on the data entry process but does not impact the data export process. A field can be designated as “required” so that it must be completed before moving on to the next field. An error message is displayed if the field is left blank. However, the user can choose to ignore the error message and continue with data entry. In other words, this is a soft requirement.
- If any of the fields require a value, then place “Y” in the cell. If not, simply leave the cell blank.

## Column N—Custom Alignment *Optional*

1. Allows you to slightly modify the way REDCap displays fields. The location of text boxes or categorical responses (dropdown, radio, or checkbox) can be specified as Right/Vertical, Left/Vertical, Right/Horizontal, Left/Horizontal.
2. The default setting, if not specified, is Right/Vertical. Right/Horizontal is specified as RH, Left/Vertical is specified as LV, and Left/Horizontal is specified as LH.

## Column O—Question Number *Optional for surveys*

REDCap can be set to auto-number questions on a survey. Allows you to add a custom number per field in survey mode. However, if you want a custom numbering scheme, you can specify each question number here. Any text in this column will be displayed as the question number.

## Column P—Matrix Group Name *Required for matrix type fields*

1. Groups fields into a matrix. In order for different fields to be displayed in the same matrix/grid together, they must be given the same matrix group name. Otherwise they will get rendered as separate matrix groups.
2. Only letters, number, and underscores can be used in the name.

## Column Q—Matrix Ranking *Optional for matrix type fields*

Flags whether or not a matrix is a ranking matrix or not. A “ranked matrix” of fields is a matrix that can be used to “rank” the choices within it so that no two fields in the matrix can have the same selected value for a given column. For example, if ranking is enabled for a matrix and a user then selects a choice for one field that has already been selected for another field, it will automatically deselect the value for that other field and display a quick message saying “value removed!” to denote that the value was removed for the other field. This prevents two fields from having the same selected value.

## Column R—Field Annotation *Optional*

“Field annotations” can be used to add explanatory notes or commentary about a given field. This can be used for several purposes, such as for the bookkeeping of a project’s field structure (as metadata about the given field) for reference purposes regarding what the field represents or how it should be used (during data entry, analysis, etc). Field annotations are not displayed on any page but are merely for reference. Summarily, field annotations do not have a specifically defined purpose, so users may use them in whatever way they so choose.

## Sample Data Dictionary

Variable	Form Name	Section	Field Type	Field Label	Choices	C Field	Text Valid	Text Valid	Text Valid	Identifier	Branching	Required	Custom A	Question	Matrix Gr	Matrix Rai	Field Annotation
record_id	ice_cream		text	Record ID													
agree_to	ice_cream		radio	Do you agree?	1, Yes   2, No												
first_name	ice_cream		text	Enter your first name:													
email	ice_cream		text	Enter your email address:					email								
birthday	ice_cream		text	When is your birthday?					date_mdy								We are only collecting data from people who are between 18-60 years of age.
age	ice_cream		calc	You are currently	datediff("today", [birthday], "y", "mdy"), 0												We are only collecting data from people who are 18-60 years of age.
times	ice_cream		text	How many times per week do you eat ice cream?					number								
purchase	ice_cream		text	Date of Purchase:					date_mdy	1/1/2016							
places	ice_cream		notes	List all of the places you buy Ice Cream:													
favorite	ice_cream		dropdown	What is your favorite ice cream?	1, Chocolate   2, Strawberry   3, Vanilla   4, Butter Pecan   5, Mint Chocolate Chip												
favorite	ice_cream		radio	What is your favorite ice cream?	1, Chocolate   2, Strawberry   3, Vanilla   4, Butter Pecan   5, Mint Chocolate Chip												
favorite	ice_cream		checkbox	Check all that apply													
like	ice_cream		yesno	Do you like Ice Cream?													
dislike	ice_cream		truefalse	You do not like Ice Cream!													
signature	ice_cream		file	Sign your name:					signature								
picture	ice_cream		file	Please upload a picture of you eating Ice Cream:													
how_often	ice_cream		slider	How often do you eat ice cream?	Once a Year   Every:				number								
sundae	ice_cream		description	The sundae is a sweet ice cream dessert. It typically consists of one or more scoops of ice cream topped with sauce or syrup, and in some cases other toppings including sprinkles and whipped cream.													
sq	ice_cream		sql						autocomplete								
choc	ice_cream	How often	radio	Chocolate	1, Never   2, Rarely   3, Sometimes   4, Often   5, Always												icecream_matrix
straw	ice_cream	How often	radio	Strawberry	1, Never   2, Rarely   3, Sometimes   4, Often   5, Always												icecream_matrix
van	ice_cream	How often	radio	Vanilla	1, Never   2, Rarely   3, Sometimes   4, Often   5, Always												icecream_matrix
butpec	ice_cream	How often	radio	Butter Pecan	1, Never   2, Rarely   3, Sometimes   4, Often   5, Always												icecream_matrix
mintchoc	ice_cream	How often	radio	Mint Chocolate	1, Never   2, Rarely   3, Sometimes   4, Often   5, Always												icecream_matrix
other	ice_cream	How often	radio	Other	1, Never   2, Rarely   3, Sometimes   4, Often   5, Always												icecream_matrix
other_text	ice_cream		text	If other, please specify:													[other_ice_cream] + 'f'
kind	ice_cream		radio	What kind of ice cream?	1, Chocolate   2, Strawberry   3, Vanilla												
icecream	ice_cream		radio	How often do you eat ice cream?	1, Once a week   2, Twice a week   3, Three times a week												
favfla	ice_cream		text	What are your favorite flavors of ice cream?													
describe	ice_cream		notes	Describe how you feel when you eat your favorite flavor of ice cream.													

## Uploading the Data Dictionary

Remember that the data dictionary is a file entirely outside of REDCap. The file must be uploaded into the project in order to execute the structure in REDCap. Uploading the file is essentially re-creating the entire project structure. All fields in the dictionary will replace all fields in the project. **Note:** They will not add on to the current structure of the project, but will instead totally replace it.

### Upload your Data Dictionary file (CSV file format only)

Format for min/max validation values for date and datetime fields:

No file chosen

After modifying and saving the data dictionary, it can be uploaded into REDCap. Choose your file name and then click on the "Upload File" button.

### Upload your Data Dictionary file (CSV file format only)

Format for min/max validation values for date and datetime fields:

IceCreamPro...-11-21.csv

A summary screen will be displayed. It is vital to review this screen and ensure it makes sense for the changes you were trying to execute. That is your chance to stop and double-check the total number of current and new fields. These totals should make sense for the changes you made in the data dictionary.

### ✓ Your document was uploaded successfully and awaits your confirmation below.

- No errors or warnings were found in the document.
- The uploaded data dictionary **contains 30 fields**, which will replace the 30 fields that currently exist in the project (excluding 'Form Status' fields, which are automatically generated by REDCap).

Once you have verified the information, you are ready to proceed. Are you ready to commit the changes to the project from the uploaded Data Dictionary? If so, click on the "Commit

## Commit Changes

After you commit changes, you will see the following screen:

### ✔ Changes Made Successfully!

The field changes included in the uploaded Data Dictionary have been committed.

The next step is to test your new project structure. The best way to test instruments is to enter practice data. It is truly critical to test the instruments during development because changes are made immediately and are less likely to impact real project data.

## Data Import Tool

Data from another source can be imported using the “**Data Import Tool**”. The “**Data Import Tool**” requires that data to be imported is in CSV (comma separated variables) format. The order of the fields or the number of fields being imported does not matter, except that the record identifier (Ex: Record ID) must be the first field. Below are the steps you will need to follow in order to import your data successfully into your project.

### Import Template

1.) First download an import template file (CSV format). The template contains column headings labelled with the field names from your data dictionary, plus the form status indicator fields. Calculated fields are omitted from the template, you cannot import data into a calculated field, but calculated files can be updated following an import. To download, click the link to download your data import template as a CSV (comma delimited) file. Save it locally to your computer and then open it to begin filling it with the data you wish to import.

- Ⓛ [Download your Data Import Template](#) (with records in rows) OR
- Ⓛ [Download your Data Import Template](#) (with records in columns)

Your template can be formatted with records in rows or records in columns. “Records in rows” is more common. For this example, we used download your **Data Import Template with records in columns**:

Variable / Field Name	Record	Record	Record	Record	Record	Record
record_id						
redcap_event_name						
redcap_data_access_						
agree_to_participate						
first_name						
email_address						
birthday						
times						
purchase_date						
places						
favorite						
favorite_ice_cream						
favorite_ice_cream_a						
favorite_ice_cream_a						
favorite_ice_cream_a						
favorite_ice_cream_a						
like_ice_cream						
dislike_ice_cream						

Variable / Field Name	Record	Record	Record	Record	Record	Record
how_often_eat_ice_c						
sql						
choc						
straw						
van						
butpec						
mintcc						
other_ice_cream						
other_text						
kind_icecream						
icecream_often						
ice_cream_complete						
favfla_icecream						
describe_favflav_icec						
flavors_complete						

2.) In each column of the Data Import Template file that you downloaded, place the data for each record that you wish to import. Once all your data has been added, save the file.

- Be sure not to change the Variables/Field Names in the file or an error may occur.
- Also, for all of the “dropdown” or “radio” fields in the project, you must make sure that the numerical value (rather than the text value) is entered in those cells, or else it cannot be processed.
- Any empty rows or columns in the file can be safely deleted before importing the file. Doing this reduces the upload processing time, especially for large projects.

3.) Click the “Browse” or “Choose File” button below to select the file on your computer, and upload it by clicking the “Upload File” button.

4.) Once your file has been uploaded, the data will NOT be immediately imported but will be displayed and checked for errors to ensure that all the data is in correct format before it is finally imported into the project.

Depending on your type of project (longitudinal) and Data Access Group assignments, you may see the following screen:

 **How to assign records to Data Access Groups:**  
 Since this project has Data Access Groups and since you are not in a group, you are able to assign or re-assign records to groups. You may assign records to groups by utilizing the 'redcap\_data\_access\_group' field in your data import file, in which you will provide a **unique group name** for each record. A list of all the unique group names for each Data Access Group are listed on the [Data Access Groups](#) page.

 **How to import records for events:**  
 In order to import records for longitudinal projects such as this one, you must use the 'redcap\_event\_name' field in your data import file, in which you will provide a **unique event name** for each record. This will tell it which event that the data belongs to for that record. A list of all the unique names are listed on the [Define My Events](#) page. If the 'redcap\_event\_name' field is not specified for every record being imported, it will display an error.

When you are ready to import the data, click the “Browse” or “Choose File” button to select the file on your computer, and upload it by clicking the “Upload File” button.

**Record format:** The file to be uploaded has its records stored as separate  Columns ▾

**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) ▾

 **Upload your CSV file:**

IceCreamPro...6-11-21.csv

## Error Correction

If there are any errors detected when the file is uploaded, you will see the following screen:

 **Errors were detected in the file that was uploaded.**

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
12 (event_1_arm_1)	redcap_data_access_group		This field name does not exist in the project.
12 (event_1_arm_1)	favorite	Chocolate	The value is not a valid category for favorite
12 (event_1_arm_1)	favorite_ice_cream		This field ('favorite_ice_cream') cannot be modified because it has been set as this project's randomization field, which can never be modified for any record. This field MUST be removed from the uploaded data file.
12 (event_1_arm_1)	kind_icecream	Chocolate	The value is not a valid category for kind_icecream

You will need to go and correct all of the errors shown on the error table in red. After you have corrected all the errors, you can upload the file again.

 **Your document was uploaded successfully and is ready for review.**

You are now required to view the Data Display Table below to approve all the data before it is officially imported into the project. Follow the instructions below.

## Upload Summary

REDCap does not import the data from your file immediately. First it parses your file and displays a summary view. The summary view (**Key for Data Display Table**) highlights what will be done with each data point in your import file. **Note:** Data can be imported into your project to create or update records. You cannot delete data using the “**Data Import Tool**”: blank values in an import file will not overwrite existing data values.

### Instructions for Data Review

The data you uploaded from the file is displayed in the Data Display Table below. Please inspect it carefully to ensure that it is all correct. After reviewing it, click the 'Import Data' button at the bottom of this page to import this data into the project.

#### KEY for Data Display Table below

Black text = New Data

Gray text = Existing data (will not change)

(Red text) = Data that will be overwritten

Red box = error

Orange box = warning

#### DATA DISPLAY TABLE

record_id	12 (new record)	13 (new record)	14 (new record)	15 (new record)	16 (new record)	17 (new record)
redcap_event_name	event_1_arm_1	event_1_arm_1	event_1_arm_1	event_1_arm_1	event_1_arm_1	event_1_arm_1
agree_to_participate	1	1	1	1	1	1
first_name	John	Gary	Nate	Chad	Matthew	Michael
email_address						
birthday	1975-05-15	1975-05-16	1975-05-17	1975-05-18	1975-05-19	1975-05-20
times	4	2	3	1	2	1
purchase_date	2016-10-01	2016-10-11	2016-10-21	2016-10-31	2016-10-22	2016-10-11
places	Grocery Store	Ice Cream Shop	Grocery Store	Sam's Club	Grocery Store	Ice Cream Shop
favorite	1	4	3	2	1	2
favorite_ice_cream_all__1	0	0	0	0	0	0

The data you uploaded from the file is displayed in the "Data Display Table". You will need to review the data carefully to ensure that it is all correct. When you have reviewed the summary page, complete the import and commit the data to the database by clicking the "Import Data" button at the bottom of the page.

**Do you wish to import the new data (displayed above) into the project?**  
(Click the button below to import the data.)

Import Data

After you click the "Import Data" button, you will see the import successful screen:

 **Import Successful!** 6 records were created or modified during the import.

The data you uploaded from the file was successfully imported into the project. If you wish to import more data, you may use the box above to select another file on your computer.

### Importing to Checkbox Fields

Checkbox groups are treated as separate fields named according to the field name specified plus a zero-based index. Below illustrates the import template for a checkbox field named "checkboxquestion" that has three checkboxes. Following import, the first checkbox will be unticked (value=0) and checkboxes two and three will be ticked (value=1).

X	Y	Z
checkboxquestion__0	checkboxquestion__1	checkboxquestion__2
0	1	1

- Choice 0
- Choice 1
- Choice 2

### Importing to Date and DateTime Fields

Date values must be formatted as yyyy-mm-dd or dd/mm/yyyy

Date/time values must be formatted as yyyy-mm-dd HH:MM[:SS] or dd/mm/yyyy HH:MM[:SS]

D	E
dob	enrol_date_time
2001-10-30	2011-12-14 12:30

## Calculated Fields

You cannot import data into a calculated field, but calculated fields will be updated following an import. Calculated fields are omitted from the import template. See the **Calculated Field** section for more detailed information.

## Importing Data for Longitudinal Projects

When importing data into a longitudinal project, you must include a column that specifies the unique event name for each record. You can find the values to use on the “**Define My Events**” page from “**Project Setup**”.

	Event #	Days Offset	Offset Range Min / Max	Event Name	Unique event name (auto-generated)
	1	0	-0/+0	Event 1	event_1_arm_1
	2	7	-2/+2	Event 2	event_2_arm_1
	3	14	-0/+0	Event 3	event_3_arm_1
Add new event		<input type="text"/> Days	<input type="text"/> - <input type="text"/> + <input type="text"/>	<input type="text"/>	
		<a href="#">Convert from other units</a>	Descriptive name for this event		

Example of file:

Variable Record	Record	Record	Record
Record_ID			
Redcap_event_name	Event one arm one	Event to arm one	Event three arm one

## Importing Data for Data Access Groups

When importing data into a project that utilizes Data Access Groups, you must include a column that specified the “**Data Access Group**” (DAG) for each record. You can find the values to use on the “**Data Access Groups**” tab from “**User Rights**”.

Data Access Groups	Users in group	Number of records in group	Unique group name (auto-generated)	Delete group?
<b>Health Sciences Group</b>		0	health_sciences_gr	
[Not assigned to a group]	mcdonaldd (Donna McDonald), mottelerc (Chris Motteler), onssipirate (Christopher Motteler) * Can view ALL records	17		

Example of file:

Variable /	Record	Record	Record	Record
record_id				
redcap_event_name				
redcap_data_access_group		health_sciences_gr	health_sciences_gr	health_sciences_gr

Where the user performing the import is assigned to a DAG, records are automatically assigned to the user's DAG. Such users cannot import records to other DAGs. Records can also be assigned and re-assigned to a Data Access Group individually from their data entry forms following import.

## Data Comparison Tool

The “**Data Comparison Tool**” enables you to select two records (including the event, for longitudinal projects) to compare any data side-by-side. Fields are highlighted where data values differ between the two records. Select a record from each of the lists and click on the “**Compare**” button.

Record ID	
1 - Event 1 (Arm 1: Flavors) ▼	2 - Event 1 (Arm 1: Flavors) ▼
<input type="button" value="Compare"/>	

A comparison table will then be displayed showing the differences between the two records. The table compares the two records named 1 and 2. Only the fields that have differing values are listed in the table. If you need to correct or change the value of one of the records below, simply click on the data displayed in red and it will take you to that form for that particular record.

Label (field name)	Form Name	Record ID	
		1 Event 1 (Arm 1: Flavors)	2 Event 1 (Arm 1: Flavors)
Enter your first name: ( <i>first_name</i> )	Ice Cream	Donna	
Enter your email address: ( <i>email_address</i> )	Ice Cream	mcdonaldd@ecu.edu	
When is your birthday? ( <i>birthday</i> )	Ice Cream	04-09-1963	
How many times per week do you eat Ice Cream: ( <i>times</i> )	Ice Cream	1	
Date of Purchase: ( <i>purchase_date</i> )	Ice Cream	10-01-2016	
List all of the places you buy Ice Cream: ( <i>places</i> )	Ice Cream	Grocery Store Ice Cream Shop Walmart	
What are your favorite flavors of Ice Cream? (Choice = <b>Chocolate</b> ) ( <i>favorite_ice_cream_all</i> » <i>favorite_ice_cream_all__1</i> )	Ice Cream	Checked (1)	Unchecked (0)
What are your favorite flavors of Ice Cream? (Choice = <b>Strawberry</b> ) ( <i>favorite_ice_cream_all</i> » <i>favorite_ice_cream_all__2</i> )	Ice Cream	Checked (1)	Unchecked (0)
What are your favorite flavors of Ice Cream? (Choice = <b>Butter Pecan</b> ) ( <i>favorite_ice_cream_all</i> » <i>favorite_ice_cream_all__4</i> )	Ice Cream	Checked (1)	Unchecked (0)
Do you like Ice Cream? ( <i>like_ice_cream</i> )	Ice Cream	Yes (1)	
You do not like Ice Cream! ( <i>dislike_ice_cream</i> )	Ice Cream	False (0)	

## Double Data Entry

As a preventive measure, REDCap prevents users from entering duplicate records. However, some projects may need to enter data twice for each record as a means of ensuring quality data collection by later comparing the records. This can be done using the “**Double Data Entry**” module. The “**Double Data Entry**” module needs to be enabled by the REDCap administrator prior to any data being collected in the project. When you contact the REDCap Administrator, be sure to include the name of your project. When the module is enabled, REDCap collects data differently than normal. It allows you to designate any two project users or roles as “**Data Entry Person 1**” and “**Data Entry Person 2**”, which is done on the “**User Rights**” page. You will first need

to create new roles for Data Entry 1 and Data Entry 2, which is also done on the “User Rights” page.

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



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

Add the necessary user rights to this role. Under “Other privileges:” you will see **Double Data Entry** privileges. You can click on

Person #1 and then click “**Create role**” at the bottom of the page. Repeat the above instructions for the Data Entry 2 role. Once both roles have been created, you will need to add users to the role.

Role name <small>(click role name to edit role)</small>	Username or users assigned to a role <small>(click username to edit or assign to role)</small>	Expiration <small>(click expiration to edit)</small>	Project Design and Setup	User Rights	Data Access Groups	Data Export Tool
<b>Data Entry 1</b>	<b>onssiprate</b> (Christopher Motteler)	never	✘	✘	✘	De-Identified
<b>Data Entry 2</b>	<b>mottelerc</b> (Chris Motteler)	never	✘	✘	✘	De-Identified
<b>Project Manager</b>	<b>mcdonaldd</b> (Donna McDonald)	never	✔	✔	✔	Full Data Set

Once designated, either of these two users can begin entering data independently and they will be allowed to create duplicate records. They will not be able to access each other’s data and only normal users (called Reviewers) will be able to see all three copies of the data. Once each designated data entry person has created an instance of the same record, both instances can then be compared side by side using the “**Data Comparison Tool**” and merged into a third instance.

## Record Locking Customization

The “**Record Locking Customization**” application is used for customizing the Record Locking option and E-signature option on data collection instruments. The settings are completely optional; however, they can help you gain greater control over the status of the data in your project. Records that are “**locked**” cannot be updated unless the lock is first removed by a user with “Lock/Unlock” privileges.

Only users with “Lock/Unlock” user privileges can access the “**Customization Module for E-signatures and Record Locking Functionality**” page and they are the only ones who can lock and unlock records for a specific form. If they have the additional privilege, they may lock all forms at once for any given record. By default, any user with “Lock/Unlock” privileges will be able to see the Lock option at the bottom of the data collection instrument, although other users will not see this option. Once a form is locked for a record, the form will display (for all users) the time it was locked and the user who locked it and all fields on the form will be disabled/read-only until someone with “Lock/Unlock” privileges unlocks the form.

You may set the “Record Locking” option **to be displayed** or **not be displayed** on any given form by checking/unchecking the checkboxes on the far left. By default, the Record Locking option will be displayed on all forms for those with appropriate rights. You may also provide custom text to be displayed for the Lock option by entering it in the text box and clicking “**Save**”. If you have set the option to display the Lock option but have not set any custom text, the following text will be displayed by default: “***Lock this record for this form? If locked, no user will be able to edit this record on this form until someone with***

***Lock/Unlock privileges unlocks it.***” If custom text has been set, it can be edited  or removed  at any time by clicking the icons on the right. If nothing is changed on the page from its original settings, then the

Lock option will be displayed on all forms for any user with “Lock/Unlock” privileges, and will display the default text listed above.

Sample screen of **to be displayed**:

Display the Lock option for this instrument?	Data Collection Instrument	Also display E-signature option on instrument?	Lock Record Custom Text	Edit / Remove Custom Text
<input checked="" type="checkbox"/>	Ice Cream	<input type="checkbox"/>	<input type="text"/> <input type="button" value="Save"/>	
<input checked="" type="checkbox"/>	Flavors	<input type="checkbox"/>	<input type="text"/> <input type="button" value="Save"/>	

Sample screen of **not to be displayed**:

Display the Lock option for this instrument?	Data Collection Instrument	Also display E-signature option on instrument?	Lock Record Custom Text	Edit / Remove Custom Text
<input type="checkbox"/>	Ice Cream	<input type="checkbox"/>	<input type="text"/> <input type="button" value="Save"/>	
<input type="checkbox"/>	Flavors	<input type="checkbox"/>	<input type="text"/> <input type="button" value="Save"/>	

Once you have checked the box to “Display the lock option for this instrument?” you will see a new section in your records. The new section is located in the “Form Status” section under “Complete?”. You will check the box beside “Lock” and click the “Save Record” button.

**Lock this record for this form?**

If locked, no user will be able to edit this record on this form until someone with Lock/Unlock privileges unlocks it.

 Lock

After you click the “Save Record” button, you will see a dialog box showing the record is locked and who locked it.

 **Locked by mcdonald** (Donna McDonald) on 11/22/2016 10:36am

A user has locked record "3" for the form "Ice Cream". If you have locking/unlocking privileges, you may unlock this record at the bottom of the page.

When a record has been locked, the record information changes in the “Data Collection” menu on the left side of the screen.

Record ID 3 [Select other record](#)

Event: **Event 1 (Arm 1: Flavors)**

Data Collection Instruments:

- Ice Cream
- Lock all forms
- Unlock all forms

Notice, the “Lock all forms” and “Unlock all forms” links listed. To unlock a record from this menu, click on “Unlock all forms” link. After you click the “Unlock all forms” link, you will see a dialog box to verify you want to unlock the record. Click on the “OK” button, to unlock the record.

redcap.ecu.edu says:

UNLOCK ALL FORMS?

Do you wish to unlock all data entry forms for record "3"? NOTE: Any e-signatures that have been saved for any forms will be negated in this process.

OK Cancel

redcap.ecu.edu says:

All data entry forms have now been UNLOCKED for record "3". The page will now reload to reflect the changes.

Prevent this page from creating additional dialogs.

OK

To unlock a record, edit the record and then click on the “Unlock form” button.

Lock this record for this form?  Lock **Unlock form**

If locked, no user will be able to edit this record on this form until someone with Lock/Unlock privileges unlocks it.

Locked by mcdonaldd (Donna McDonald) on 11/22/2016 10:36am

-- Cancel --

After you click the “Unlock form” button, you will see a dialog box to verify you want to unlock the record. Click on the “Unlock” button.

**UNLOCK FORM?**

Are you sure you wish to unlock this form for record "3"?

Unlock Cancel

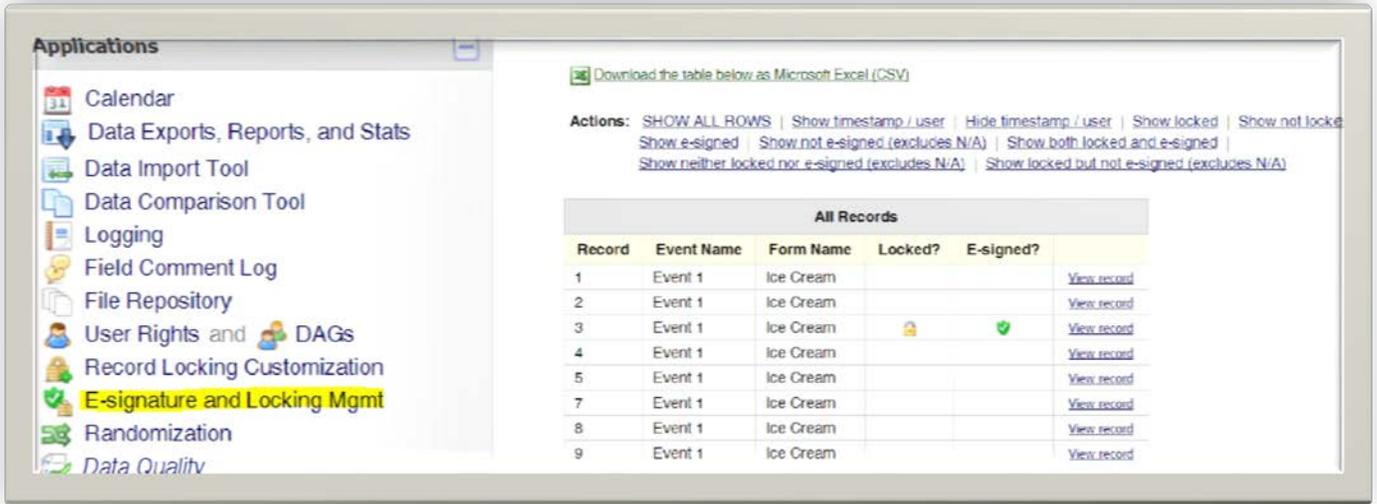
After you click the “Unlock” button, you will see a dialog box stating your record was successfully unlocked. Click on the “Close” button.

**UNLOCK SUCCESSFUL!**

This form has now been unlocked. Users can now modify the data again on this form.

Close

The “**E-signature and Locking Management**” application gives you various views of the “Lock/E-Sign” status of your data entry forms. E-signatures are an extension of the record locking/unlocking functionality. The table shown will display all existing records in the project with their status as locked or e-signed for all data entry forms. Forms that do not allow locking will not be displayed. You may use the “**Actions**” links to filter the table in various ways to show or hide rows based on



criteria related to its locking or e-signature status. You may click the View Record link to view that record on the data collection instrument, which will open in a new window. If you would like to export the table as a file in CSV format, simply click the “**Download the table below as Microsoft Excel (CSV)**” link.

To activate the E-signature option on a form, you must first use the “**Record Locking Customization**” application to display the E-signature option on data collection instruments. **Note:** Only users with “Lock/Unlock” user privileges can access the “**Customization Module for E-signatures and Record Locking Functionality**” page and they are the only ones who can lock and unlock records for a specific form.

Display the Lock option for this instrument?	Data Collection Instrument	Also display E-signature option on instrument?	Lock Record Custom Text	Edit / Remove Custom Text
<input checked="" type="checkbox"/>	Ice Cream	<input checked="" type="checkbox"/>	<input type="text"/> <input type="button" value="Save"/>	
<input checked="" type="checkbox"/>	Flavors	<input checked="" type="checkbox"/>	<input type="text"/> <input type="button" value="Save"/>	

The E-signature option is displayed to users that have the e-signature privileges on forms for which the e-signature option is enabled. Once a data collection instrument has been locked for a given record in the project, a person with e-signature privileges may then apply an e-signature to that form. The e-signature option appears as a check box that says **E-signature**, which appears just above the “**Save Record**” button and immediately below the **Locked** check box.

### Lock this record for this form?

If locked, no user will be able to edit this record on this form until someone with Lock/Unlock privileges unlocks it.

 Lock

 E-signature [\(What is this?\)](#)

Save Record

Although locking a record prevents its data from being modified, the e-signature goes a step farther, and serves as the equivalent of a handwritten signature. If a record has been e-signed, then *it denotes that its data has been both locked (to prevent further changes) and authorized* (Ex: By a user with e-signature privileges).

**Note:** Anyone with locking privileges (even if lacking e-signature authority) will negate the e-signature on a form when unlocking the record, after which data changes can be made to the record. The e-signature can be re-applied after such data changes.

For any given record, an e-signature can be saved and negated on a form an unlimited number of times. When saving an e-signature, a user will be asked to enter their username and password for verification. If the username/password verification fails three times in a row, the user will be automatically logged out of REDCap.

### Lock this record for this form?

If locked, no user will be able to edit this record on this form until someone with Lock/Unlock privileges unlocks it.

 Lock

Unlock form

Locked by mcdonaldd (Donna McDonald) on 11/22/2016 10:36am

 E-signature [\(What is this?\)](#)

Save Record

The user enters their username and password to effect a signature.

#### E-signature: Username/password verification

Before forms can be locked using an e-signature, you must enter your REDCap username and password so that they may be validated. After three consecutive unsuccessful attempts, you will automatically be logged out of REDCap, thus ending this session.

Username:

Password:

Save

After the username and password is entered, you will see the following dialog box:

 E-signed by mcdonaldd (Donna McDonald) on 11/22/2016 11:09am

When you look at the record, you will see the following:

**Lock this record for this form?**  
If locked, no user will be able to edit this record on this form until someone with Lock/Unlock privileges unlocks it.

**Lock** Unlock form

Locked by mcdonaldd (Donna McDonald) on 11/22/2016 10:36am

**E-signature** [\(What is this?\)](#)

E-signed by mcdonaldd (Donna McDonald) on 11/22/2016 11:09am

-- Cancel --

To unlock the form, click on the “Unlock form” button.

**UNLOCK FORM?** ✕

Are you sure you wish to unlock this form for record "3"? NOTICE: Unlocking this form will also negate the current e-signature.

**Unlock** Cancel

After clicking on the “Unlock” button, you will see the successful dialog box.

**UNLOCK SUCCESSFUL!** ✕

This form has now been unlocked, and the existing e-signature has been negated. Users can now modify the data again on this form.

**Close**

When you look at the record again, you will see the following:

**Lock this record for this form?**  
If locked, no user will be able to edit this record on this form until someone with Lock/Unlock privileges unlocks it.

**Lock**

**E-signature** [\(What is this?\)](#)

**Save Record**

Similar to the record locking functionality, the e-signature history is also stored in REDCap's data audit trail on the Logging page. If someone wishes to view the historical record of e-signatures in the project, they may do so by filtering the audit log by “Record locking & e-signatures” either for a specific record or for all records in the project.

Filter by event: **Record locking & e-signatures** ▼

Filter by user name: All users ▼

Filter by record: All records ▼

Displaying events (by most recent): 1 - 24 ▼

Filter by time range from   31 to   31

Time / Date	Username	Action	List of Data Changes OR Fields Exported
11/22/2016 2:21pm	mcdonaldd	E-signature 3	Action: Save e-signature Record: 3 Form: Ice Cream Event: Event 1
11/22/2016 2:20pm	mcdonaldd	Lock/Unlock Record 3	Action: Lock record Record: 3 Form: Ice Cream Event: Event 1
11/22/2016 2:01pm	mcdonaldd	Lock/Unlock Record 3	Action: Unlock record Record: 3 Form: [all forms] Event: Event 1 - Arm 1: Flavors
11/22/2016 1:51pm	mcdonaldd	Lock/Unlock Record 3	Action: Lock record Record: 3 Form: Ice Cream Event: Event 1
11/22/2016 1:45pm	mcdonaldd	Lock/Unlock Record 3	Action: Unlock record Record: 3 Form: Ice Cream Event: Event 1
11/22/2016 1:30pm	mcdonaldd	Lock/Unlock Record 3	Action: Lock record Record: 3 Form: Ice Cream Event: Event 1
11/22/2016 1:30pm	mcdonaldd	Lock/Unlock Record 4	Action: Unlock record Record: 4 Form: Ice Cream Event: Event 1
11/22/2016 1:28pm	mcdonaldd	Lock/Unlock Record 4	Action: Lock record Record: 4 Form: Ice Cream Event: Event 1
11/22/2016 1:21pm	mcdonaldd	E-signature 4	Action: Negate e-signature Record: 4 Form: Ice Cream Event: Event 1
11/22/2016 1:21pm	mcdonaldd	Lock/Unlock Record 4	Action: Unlock record Record: 4 Form: Ice Cream Event: Event 1
11/22/2016 1:18pm	mcdonaldd	E-signature 4	Action: Save e-signature Record: 4 Form: Ice Cream Event: Event 1

## Data Quality

The Data Quality application enables you to run tests on your project to check for discrepancies in your data. The “**Data Quality Rules**” table show some pre-defined data rules that you may utilize and run. You may also create your own rules or edit, delete, or reorder the rules you have already created.

Data Quality Rules						
Execute rules: <span>All</span> <span>All except A&amp;B</span> <span>All custom</span> <span>Clear</span>						
Apply to: -- All records --						
Rule #	Rule Name	Rule Logic (Show discrepancy only if...)	Real-time execution ?	Total Discrepancies	Health Sciences Group	Delete rule?
A	Missing values*	-		<input type="button" value="Execute"/>		
B	Missing values* (required fields only)	-		<input type="button" value="Execute"/>		
C	Field validation errors (incorrect data type)	-		<input type="button" value="Execute"/>		
D	Field validation errors (out of range)	-		<input type="button" value="Execute"/>		
E	Outliers for numerical fields (numbers, integers, sliders, calc fields)	-		<input type="button" value="Execute"/>		
F	Hidden fields that contain values**	-		<input type="button" value="Execute"/>		
G	Multiple choice fields with invalid values	-		<input type="button" value="Execute"/>		
H	Incorrect values for calculated fields	-		<input type="button" value="Execute"/>		
<input type="button" value="Add"/>	<input type="text"/>	<input type="text"/>	<input type="checkbox"/>			
	Enter descriptive name for new rule (e.g., Participants below age 18)	Enter logic for new rule (e.g., [age] < 18) <a href="#">How do I use special functions?</a>	Execute in real time on data entry forms ?			

\* The Missing Values rules above automatically exclude fields hidden by branching logic when searching for missing values. If a field is hidden by branching logic on a data entry form or survey, then it is expected that such a field would not have a value. Thus for these cases, the values for those hidden fields will not be classified as missing. Additionally, checkbox fields are also excluded since an unchecked checkbox is itself often considered to be a real value.

\*\* The term 'hidden fields' refers to any fields on a survey or data entry form that are not being displayed because branching logic is hiding them, which assumes that the field's value should be blank/null.

## Execute Rules

The pre-defined rules listed in red text cannot be modified, reordered, or removed. They are there if you wish to use them. To find discrepancies for a given rule, simply click the “Execute” button next to it, or click the “Execute rules: All” button to run all the rules at once. The “Clear” button refreshes the view to the original state before any rules were executed.

Data Quality Rules						
Execute rules: <span>All</span> <span>All except A&amp;B</span> <span>All custom</span> <span>Clear</span>						
Apply to: -- All records --						
Rule #	Rule Name	Rule Logic (Show discrepancy only if...)	Real-time execution ?	Total Discrepancies	Health Sciences Group	Delete rule?
A	Missing values*	-		<input type="button" value="Execute"/>		
B	Missing values* (required fields only)	-		<input type="button" value="Execute"/>		
C	Field validation errors (incorrect data type)	-		<input type="button" value="Execute"/>		
D	Field validation errors (out of range)	-		<input type="button" value="Execute"/>		
E	Outliers for numerical fields (numbers, integers, sliders, calc fields)	-		<input type="button" value="Execute"/>		
F	Hidden fields that contain values**	-		<input type="button" value="Execute"/>		
G	Multiple choice fields with invalid values	-		<input type="button" value="Execute"/>		
H	Incorrect values for calculated fields	-		<input type="button" value="Execute"/>		
<input type="button" value="Add"/>	<input type="text"/>	<input type="text"/>	<input type="checkbox"/>			
	Enter descriptive name for new rule (e.g., Participants below age 18)	Enter logic for new rule (e.g., [age] < 18) <a href="#">How do I use special functions?</a>	Execute in real time on data entry forms ?			

## Discrepancies

Once you click on the “Execute rules: All” link, you will see the following table:

Data Quality Rules <span style="color: green;">✔ Processing Complete!</span> <b>Execute rules:</b> <span>All</span> <span>All except A&amp;B</span> <span>All custom</span> <span>Clear</span>							
Apply to: -- All records -- ▾							
Rule #	Rule Name	Rule Logic (Show discrepancy only if...)	Real-time execution <span>?</span>	Total Discrepancies	Health Sciences Group	Delete rule?	
A	Missing values*	-		190	<a href="#">view</a>	0	
B	Missing values* (required fields only)	-		8	<a href="#">view</a>	0	
C	Field validation errors (incorrect data type)	-		0	<a href="#">view</a>	0	
D	Field validation errors (out of range)	-		0	<a href="#">view</a>	0	
E	Outliers for numerical fields (numbers, integers, sliders, calc fields)	-		3	<a href="#">view</a>	0	
F	Hidden fields that contain values**	-		0	<a href="#">view</a>	0	
G	Multiple choice fields with invalid values	-		0	<a href="#">view</a>	0	
H	Incorrect values for calculated fields	-		0	<a href="#">view</a>	0	
<input type="text"/>		<input type="text"/>	<input type="checkbox"/>				
<input type="button" value="Add"/>	<b>Enter descriptive name for new rule</b> (e.g., Participants below age 18)	<b>Enter logic for new rule</b> (e.g., [age] < 18) <a href="#">How do I use special functions?</a>	Execute in real time on data entry forms <span>?</span>				

Rules that identify discrepancies (Ex: where your project contains data for which the calculation expression returns False) are highlighted in red. This table provides you with a total number of discrepancies found for each rule and will allow you to view the details of those discrepancies by clicking the “View” link next to each module allows you to find discrepancies in your project data.

When you click on the “View” link, you will see the following table:

Rule: <b>Missing values*</b>			
Discrepancies found: <b>190</b>			
Record (Sorted by DAG)	Discrepant fields with their values	Status	Exclude <span>?</span>
1 Event 1 (Arm 1: Flavors)	agree_to_participate = [no data]	Missing value	<a href="#">exclude</a>
1 Event 1 (Arm 1: Flavors)	favorite = [no data]	Missing value	<a href="#">exclude</a>
1 Event 1 (Arm 1: Flavors)	favorite_ice_cream = [no data]	Missing value	<a href="#">exclude</a>
1 Event 1 (Arm 1: Flavors)	other_text = [no data]	Missing value	<a href="#">exclude</a>
1 Event 1 (Arm 1: Flavors)	picture_eating_ice_cream = [no data]	Missing value	<a href="#">exclude</a>
1 Event 1 (Arm 1: Flavors)	signature = [no data]	Missing value	<a href="#">exclude</a>
1 Event 1 (Arm 1: Flavors)	sql = [no data]	Missing value	<a href="#">exclude</a>
2 Event 1 (Arm 1: Flavors)	age = [no data]	Missing value	<a href="#">exclude</a>
2 Event 1 (Arm 1: Flavors)	agree_to_participate = [no data]	Missing value	<a href="#">exclude</a>
2 Event 1 (Arm 1: Flavors)	birthday = [no data]	Missing value	<a href="#">exclude</a>
2 Event 1 (Arm 1: Flavors)	butpec = [no data]	Missing value	<a href="#">exclude</a>
2 Event 1 (Arm 1: Flavors)	choc = [no data]	Missing value	<a href="#">exclude</a>
2 Event 1 (Arm 1: Flavors)	dislike_ice_cream = [no data]	Missing value	<a href="#">exclude</a>
2 Event 1 (Arm 1: Flavors)	email_address = [no data]	Missing value	<a href="#">exclude</a>
2 Event 1 (Arm 1: Flavors)	favorite = [no data]	Missing value	<a href="#">exclude</a>

When you click the “View” button, it will show you the records that failed the data quality test. You can navigate to the record that contains the discrepant value by clicking on the value. When you click on the value, your data form will open. Clicking “exclude” will mark a discrepant value as not to be included as a

discrepancy in future executions of this rule.

If a discrepancy has been found for a given rule, any individual discrepancy in the list of results may be excluded from those results in the future. Excluding a result merely prevents it from being included in the count of discrepancies if the rule is executed again in the future. Excluded results can be accessed again by clicking the “view” link at the top of the results table for that rule, after which they can be un-excluded, if desired.

**Rule: Missing values\***  
Discrepancies found: **190**

Record (Sorted by DAG)	Discrepant fields with their values	Status	Exclude
1 Event 1 (Arm 1: Flavors)	agree_to_participate = [no data]	Missing value	<a href="#">remove exclusion</a>
1 Event 1 (Arm 1: Flavors)	favorite = [no data]	Missing value	<a href="#">exclude</a>
1 Event 1 (Arm 1: Flavors)	favorite_ice_cream = [no data]	Missing value	<a href="#">exclude</a>
1 Event 1 (Arm 1: Flavors)	other_text = [no data]	Missing value	<a href="#">exclude</a>
1 Event 1 (Arm 1: Flavors)	picture_eating_ice_cream = [no data]	Missing value	<a href="#">exclude</a>
1 Event 1 (Arm 1: Flavors)	signature = [no data]	Missing value	<a href="#">exclude</a>
1 Event 1 (Arm 1: Flavors)	sql = [no data]	Missing value	<a href="#">exclude</a>
2 Event 1 (Arm 1: Flavors)	age = [no data]	Missing value	<a href="#">exclude</a>
2 Event 1 (Arm 1: Flavors)	agree_to_participate = [no data]	Missing value	<a href="#">exclude</a>
2 Event 1 (Arm 1: Flavors)	birthday = [no data]	Missing value	<a href="#">exclude</a>
2 Event 1 (Arm 1: Flavors)	butpec = [no data]	Missing value	<a href="#">exclude</a>
2 Event 1 (Arm 1: Flavors)	choc = [no data]	Missing value	<a href="#">exclude</a>
2 Event 1 (Arm 1: Flavors)	dislike_ice_cream = [no data]	Missing value	<a href="#">exclude</a>
2 Event 1 (Arm 1: Flavors)	email_address = [no data]	Missing value	<a href="#">exclude</a>
2 Event 1 (Arm 1: Flavors)	favorite = [no data]	Missing value	<a href="#">exclude</a>

[Close](#)

## Add a New Rule

You may also build and execute your own rules at the bottom of the table. Rules can be set up using a literal logic format (Ex: [age] > 18) that will be evaluated as a Boolean value (true or false) after an existing record's value for that field is substituted (Ex: assuming a record's value is 17 for “age”, 17 > 18 evaluates as false). The logic will be applied to all existing records in the project, and for any record for which the logic evaluates as true, it will return it as a discrepancy for that rule. Similar to branching logic and calculated fields, REDCap variable/field names may be utilized in the rule logic by placing the variable name inside square brackets [ ]. Also, for longitudinal projects, you may reference a field on one specific event by prepending the variable name in the logic with the unique event name in square brackets.

Your custom rules can include mathematical operations and also advanced functions to provide you with a great amount of power for validating your project data. You can also activate the real time execution of your custom rules to continually ensure the data integrity of your project.

Data Quality Rules						
Execute rules: <input type="button" value="All"/> <input type="button" value="All except A&amp;B"/> <input type="button" value="All custom"/> <input type="button" value="Clear"/>						
Apply to: -- All records -- ▾						
Rule #	Rule Name	Rule Logic (Show discrepancy only if...)	Real-time execution <input type="checkbox"/>	Total Discrepancies	Health Sciences Group	Delete rule?
A	Missing values*	-		<input type="button" value="Execute"/>		
B	Missing values* (required fields only)	-		<input type="button" value="Execute"/>		
C	Field validation errors (incorrect data type)	-		<input type="button" value="Execute"/>		
D	Field validation errors (out of range)	-		<input type="button" value="Execute"/>		
E	Outliers for numerical fields (numbers, integers, sliders, calc fields)	-		<input type="button" value="Execute"/>		
F	Hidden fields that contain values**	-		<input type="button" value="Execute"/>		
G	Multiple choice fields with invalid values	-		<input type="button" value="Execute"/>		
H	Incorrect values for calculated fields	-		<input type="button" value="Execute"/>		
1	Participants above age 18	[age] > 18	<input checked="" type="checkbox"/>	<input type="button" value="Execute"/>		<input checked="" type="checkbox"/>
<div style="display: flex; justify-content: space-between; align-items: flex-start;"> <div style="width: 15%;"> <input type="button" value="Add"/> </div> <div style="width: 30%;"> <input type="text"/> <p>Enter descriptive name for new rule (e.g., Participants below age 18)</p> </div> <div style="width: 30%;"> <input type="text"/> <p>Enter logic for new rule (e.g., [age] &lt; 18) <a href="#">How do I use special functions?</a></p> </div> <div style="width: 15%;"> <input type="checkbox"/> <p>Execute in real time on data entry forms <input type="checkbox"/></p> </div> </div>						

Add a new rule by entering a description of the rule and the calculation expression. Then click “Add”. If your expression includes a “less than” sign (<), make sure that you include a space after it (as shown above). Special functions may also be used within the logic as well (similar to functions in calculated fields), all of which are listed on the [Help & FAQ](#) page. If Data Access Groups exist for this project, then discrepancies will also be stratified according to their group (assuming the user viewing this page is not in a group). Any user within a Data Access Group will only be able to see the discrepancies for their own group. Also, if users do not have user privileges to view or edit data on specific data entry forms, then they will not be able to view data from those forms if displayed in any results on this page as a data quality discrepancy.

**Note:** Although setting up a Data Quality custom rule may at times be very similar to constructing an equation for a calculated field, calc fields will ALWAYS have to result in a number, whereas the Data Quality custom rule must ALWAYS result with a TRUE or FALSE condition and NEVER a value.

### Real-time Execution

Checking the “Real-time execution” checkbox for any custom data quality rule will enable the rule to be executed invisibly on data entry forms whenever a user clicks the “Save” button to create or modify a record. After clicking “Save”, it will execute all relevant data quality rules invisibly (Ex: behind the scenes) and will display a warning pop-up message if any of the rules have been violated, in which it will display a list of the data quality rules that were violated and also display the fields involved with their data values. If no rules were violated, then it will save the record as usual and not display a pop-up message. Just like the results that are returned when executing rules on the Data Quality page itself, results displayed on data entry forms for “Real-time execution” can be excluded (if desired) so that they will not be displayed again if they are still in violation in the future.

Data Quality Rules						
Execute rules: All All except A&B All custom Clear						
Apply to: -- All records --						
Rule #	Rule Name	Rule Logic (Show discrepancy only if...)	Real-time execution?	Total Discrepancies	Health Sciences Group	Delete rule?
A	Missing values*	-		Execute		
B	Missing values* (required fields only)	-		Execute		
C	Field validation errors (incorrect data type)	-		Execute		
D	Field validation errors (out of range)	-		Execute		
E	Outliers for numerical fields (numbers, integers, sliders, oaks fields)	-		Execute		
F	Hidden fields that contain values**	-		Execute		
G	Multiple choice fields with invalid values	-		Execute		
H	Incorrect values for calculated fields	-		Execute		
1	Participants above age 18	(age) > 18	<input checked="" type="checkbox"/>	Execute		<input checked="" type="checkbox"/>

<input type="button" value="Add"/>	<input type="text"/> Enter descriptive name for new rule <small>(e.g., Participants below age 18)</small>	<input type="text"/> Enter logic for new rule <small>(e.g., (age) &lt; 18)</small> <small>How do I use special functions?</small>	<input type="checkbox"/> Execute in real time on data entry forms?
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## Data Entry Trigger

The Data Entry Trigger provides a way for REDCap to trigger a call to a remote web address (URL), in which it will send a HTTP POST request to the specified URL whenever **any** record or survey response has been created or modified on **any** data collection instrument or survey in this project (it is **not** triggered by data imports - including API imports - but only by normal data entry on surveys and data entry forms). The main purpose is for notifying other remote systems outside REDCap at the very moment a record/response is created or modified, whose purpose may be to trigger some kind of action by the remote website, such as making a call to the REDCap API.

To enable the “Data Entry Trigger” option, go to the “Enable optional modules and customizations” module and click the “Additional customizations” button.

  
 Optional

### Enable optional modules and customizations

Auto-numbering for records ?

Scheduling module (longitudinal only) ?

Randomization module ?

Designate an email field to use for invitations to survey participants ?

Scroll down to the list and you will see “Data Entry Trigger”. Click on the checkbox to choose this option and add the URL of the website to use and then click “Save”.

### Data Entry Trigger

The Data Entry Trigger is an advanced feature. It provides a way for REDCap to trigger a call to a remote web address (URL), in which it will send a HTTP POST request to the specified URL whenever “any” record or survey response has been created or modified on “any” data collection instrument or survey in this project (It is “not” triggered by data imports - including API imports and Mobile App imports - but only by normal data entry on surveys and data entry forms). Its main purpose is for notifying other remote systems outside REDCap at the very moment a record/response is created or modified, whose purpose may be to trigger some kind of action by the remote website, such as making a call to the REDCap API. [View more details](#)

URL of website:

Example: [https://www.mywebsite.com/redcap\\_trigger\\_receive/](https://www.mywebsite.com/redcap_trigger_receive/)  
 Example: </det/index.php>

For example, if you wish to log the activity of records being modified over time by a remote system outside REDCap, you can use this to do so. Another use case might be if you’re using API data export to keep another system’s data in sync with data in a REDCap project, in which the “Data Entry Trigger” would allow you to keep them exactly in sync by notifying your triggered

script to pull any new data from at the moment it is saved in REDCap (this might be more optimal and accurate than running a cron job to pull the data every so often from REDCap).

In the HTTP Post request, the following parameters will be sent by REDCap in order to provide a context for the record that has just been created/modified:

- **project\_id** - The unique ID number of the REDCap project (Ex: the “pid” value found in the URL when accessing the project in REDCap).
- **username** - The username of the REDCap user that is triggering the Data Entry Trigger.  
**Note:** If it is triggered by a survey page (as opposed to a data entry form), then the username that will be reported will be “[survey respondent]”.
- **instrument** - The unique name of the current data collection instrument (all your project's unique instrument names can be found in column B in the data dictionary).
- **record** - The name of the record being created or modified, which is the record's value for the project's first field.
- **redcap\_event\_name** - The unique event name of the event for which the record was modified (for longitudinal projects only).
- **redcap\_data\_access\_group** - The unique group name of the Data Access Group to which the record belongs (if the record belongs to a group). **[instrument]\_complete** - The status of the record for this particular data collection instrument, in which the value will be 0, 1, or 2. For data entry forms, 0=Incomplete, 1=Unverified, 2=Complete. For surveys, 0=partial survey response and 2=completed survey response. This parameter's name will be the variable name of this particular instrument's status field, which is the name of the instrument + ‘\_complete’.
- **redcap\_url** - The base web address to REDCap (URL of REDCap's home page). Ex: <https://redcap.ecu.edu/>
- **project\_url** - The base web address to the current REDCap project (URL of its Project Home page). Ex: [https://redcap.ecu.edu/redcap\\_v6.15.9/index.php?pid=XXXX](https://redcap.ecu.edu/redcap_v6.15.9/index.php?pid=XXXX)

**NOTE:** If the names of your records (Ex: the values of your first field) are considered identifiers (Ex: MRN, name), for security's sake it is highly recommended that you use an encrypted connection (Ex: SSL/HTTPS) for the URL you provide for the “Data Entry Trigger”.

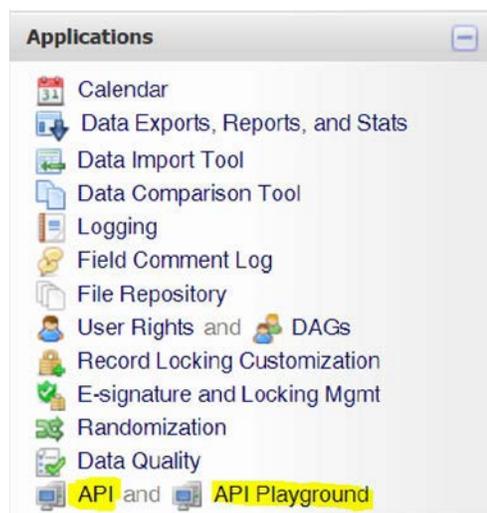
## API

The REDCap API (Application Programming Interface) is an interface that allows external applications to connect to REDCap. It enables remote retrieval or modification of data or settings within REDCap, such as performing automated data imports into or exports from a specified REDCap project. Programmers can use the REDCap API to make applications, websites, apps, widgets, and other projects that interact with REDCap. Programs talk to the REDCap API over HTTP, the same protocol that your browser uses to visit and interact with web pages. There are detailed instructions on how to use the REDCap API in the “**REDCap API Documentation**”. There is also an “**API Playground**” page in each of your REDCap projects, in which the playground will allow you to experiment with the REDCap API and see the range of its functionality without having to write any code. The first step in accessing the API for any project is to check if you have the appropriate user rights in the project in order to use the API.

### Obtaining API Tokens

In order to use the REDCap API for a given REDCap project, you must first be given a token that is specific to your username for that particular project. Rather than using username/passwords, the REDCap API uses tokens as a means of secure authentication, in which a token must be included in every API request. Please note that each user will have a different token for each REDCap project to which they have access. Thus, multiple tokens will be required for making API requests to multiple projects.

To obtain an API token for a project, navigate to that project, then click the “**API**” link in the Applications menu.



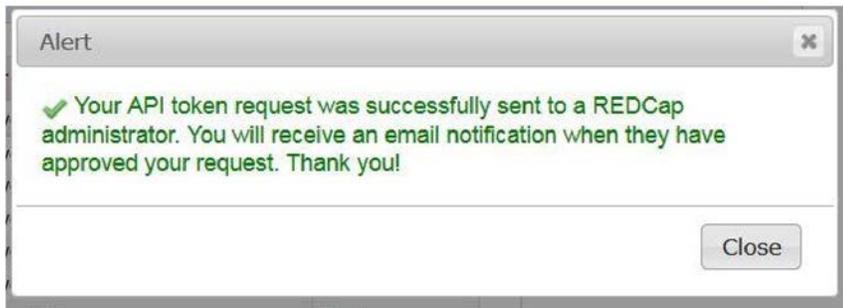
On that page you will be able to request an API token for the project from your REDCap administrator, and that page will also display your API token if one has already been assigned. If you do not see a link for the API page on your project's left-hand menu, then someone must first give you API privileges within the project (via the project's User Rights page).

#### **Request API token for Ice Cream Project for Training (Longitudinal)"**

Use the button below to request an API key from your REDCap administrator. You will need a different token for each project you would like to access. Please note that your REDCap administrator is emailed every time a token is requested.

**Request API token**

After clicking the “**Request API token**” button, you will see the following message:



After the REDCap Administrator creates your API token, you will get the following email:

**From:** [redcap@ecu.edu](mailto:redcap@ecu.edu) [mailto:redcap@ecu.edu]  
**Sent:** Tuesday, November 29, 2016 11:19 AM  
**To:** ONSSIPIRATE <[ONSSIPIRATE@ECU.EDU](mailto:ONSSIPIRATE@ECU.EDU)>  
**Subject:** [REDCap] API token has been created

[This message was automatically generated by REDCap]

An API token has been created for you for project "Ice Cream Project for Training (Longitudinal)".

[Click here to retrieve your API token](#)

Super Tokens: If you wish to utilize the "Create Project" API method, then a Super API Token is required. Super tokens are 64 characters in length (as opposed to 32-character-long regular tokens), in which a REDCap user can only have one super token at most. If you are interested in obtaining a super token, please contact your local REDCap administrator. While you wait for your API token to be approved, we recommend that you check out the "REDCap API Documentation". The link to the API documentation page can be found in the "API" application in each project.

### API Security & Best Practices

Although API requests to REDCap are done using SSL (HTTPS), which means that the traffic to and from the REDCap server is encrypted, there is still more that can be done to ensure the highest level of security when using the API. This is especially important if you are moving sensitive data into or out of REDCap. One thing that is **highly** recommended is for your API script/program (Ex: the thing making the request to the REDCap API) to **validate the SSL certificate of the REDCap web server** when it makes the API request.

Web servers have SSL certificates so that their identity can be validated and thus trusted, after which secure, encrypted communication can take place with the server. The reason it is important to validate the server's SSL certificate is because it is possible (although extremely rare) to be the victim of a "Man in the Middle Attack" even when your web traffic is secure over SSL/HTTPS. A "Man in the Middle" (MiM) attack can be performed by a hacker who impersonates the REDCap web server using a fake/invalid SSL certificate. In this way, it is possible for your API script to think that the hacker is really the REDCap server and thus unwittingly send your request not to REDCap but to the hacker, in which he/she can actually see the contents of your request, including your API token, and then use your token to impersonate you to make API requests to REDCap in the future as if they were you.

Preventing MiM attacks is pretty simple. Essentially all you need to do is to force your API script to validate the SSL certificate of the REDCap server. REDCap's SSL certificate will always be valid, but the hacker's fake certificate can never be determined to be valid if you attempt to validate it. In many programs or programming languages that can make API requests, validating an SSL certificate is often as easy as setting a flag. For example, cURL is popularly used by many API scripts in programming languages such as PHP, R, SAS, and many more in order to make the

web request to REDCap. **So if your API script is utilizing cURL, all you need to do is modify your script so that it sets the cURL option named CURLOPT\_SSL\_VERIFYPEER to have a value of TRUE.** Once done, your API script will attempt to make the API request to REDCap **only** if it can validate REDCap's SSL certificate. **Thus by adding the SSL certificate check, you have completely prevented the possibility of MiM attacks and are using the most secure form of communication with the REDCap API.** If you are not using cURL, there are plenty of other examples on the web for how to validate an SSL certificate in different programming languages. Such examples can be found simply by Googling the name of your programming language + "verify ssl certificate" (Ex: "Java verify ssl certificate"), which should provide you with many helpful results.

**Note:** Please remember that while REDCap itself has many security layers to help protect you and to ensure the highest level of security and data integrity, it is **your** responsibility to ensure that you are using the most secure methods and best practices when using the REDCap "API".

## Supported Methods

There are several supported methods to use for your API, including programming examples:

- **Arms (Longitudinal Projects Only)**
  - **Export Arms**—This method allows you to export the Arms for a project.
  - **Import Arms**—This method allows you to import Arms into a project or to rename existing Arms in a project. You may use the parameter `override=1` as a "delete all + import" action to erase all existing Arms in the project while importing new Arms. **Note:** Because of the "override" parameter's destructive nature, this method may only use `override=1` for projects in **Development** status.
  - **Delete Arms**—This method allows you to delete Arms from a project. **Note:** Because of this method's destructive nature, it is only available for use for projects in **Development** status. Additionally, please be aware that deleting an arm also automatically deletes all events that belong to that arm and will also automatically delete any records/data that have been collected under that arm (this is non-reversible data loss).
- **Events (Longitudinal Project Only)**
  - **Export Events**—This method allows you to export the events for a project.
  - **Import Events**—This method allows you to import Events into a project or to update existing Events' attributes, such as the event name, days offset, etc. The unique event name of an Event cannot be changed because it is auto-generated by REDCap. Please note that the only way to update an existing Event is to provide the `unique_event_name` attribute, and if the `unique_event_name` attribute is missing for an Event being imported (when `override=0`), it will assume it to be a new Event that should be created. **Note:** Because of the "override" parameter's destructive nature, this method may only use `override=1` for projects in **Development** status.
  - **Delete Events**—This method allows you to delete Events from a project. **Note:** Because of this method's destructive nature, it is only available for use for projects in **Development** status. Additionally, please be aware that deleting an arm also automatically deletes all events that belong to that arm and will also automatically delete any records/data that have been collected under that arm (this is non-reversible data loss).
- **Field Names**
  - **Export List of Export Field Names**—This method returns a list of the export/import-specific version of field names for all fields (or for one field, if

desired) in a project. This is mostly used for checkbox fields because during data exports and data imports, checkbox fields have a different variable name used than the exact one defined for them in the “**Online Designer**” and “**Data Dictionary**”, in which **each checkbox option** gets represented as its own export field name in the following format: field\_name + triple underscore + converted coded value for the choice. For non-checkbox fields, the export field name will be exactly the same as the original field name. **Note:** The following field types will be automatically removed from the list returned by this method since they cannot be utilized during the data import process: "calc", "file", and "descriptive".

The list that is returned will contain the three following attributes for each field/choice: "original\_field\_name", "choice\_value", and "export\_field\_name". The choice\_value attribute represents the raw coded value for a checkbox choice. For non-checkbox fields, the choice\_value attribute will always be blank/empty. The export\_field\_name attribute represents the export/import-specific version of that field name.

- **Files**

- **Export a File**—This method allows you to download a document that has been attached to an individual record for a File Upload field. **Note:** this method may also be used for Signature fields (Ex: File Upload fields with "signature" validation type).

**Note about export rights:** Please be aware that Data Export user rights will be applied to this API request. For example, if you have "No Access" data export rights in the project, then the API file export will fail and return an error. And if you have "De-Identified" or "Remove all tagged Identifier fields" data export rights, then the API file export will fail and return an error **only if** the File Upload field has been tagged as an Identifier field. To make sure that your API request does not return an error, you should have "Full Data Set" export rights in the project.

- **Import a File**—This method allows you to upload a document that will be attached to an individual record for a File Upload field. **Note:** this method may **NOT** be used for Signature fields (Ex: File Upload fields with "signature" validation type) because a signature can only be captured and stored using the web interface.
- **Delete a File**—This method allows you to remove a document that has been attached to an individual record for a File Upload field. **Note:** this method may also be used for Signature fields (Ex: File Upload fields with "signature" validation type).

- **Instruments**

- **Export Instruments (Data Entry Forms)**—This method allows you to export a list of the data collection instruments for a project. This includes their unique instrument name as seen in the second column of the “**Data Dictionary**”, as well as each instrument's corresponding instrument label, which is seen on a project's left-hand menu when entering data. The instruments will be ordered according to their order in the project.
- **Export PDF file of Instruments**—This method allows you to export a PDF file for any of the following: 1) a single data collection instrument (blank), 2) all instruments (blank), 3) a single instrument (with data from a single record), 4) all instruments (with data from a single record), or 5) all instruments (with data from ALL records). This is the exact same PDF file that is downloadable from a project's data entry form in the web interface, and additionally, the user's

privileges with regard to data exports will be applied here just like they are when downloading the PDF in the web interface (Ex: if they have de-identified data export rights, then it will remove data from certain fields in the PDF). If the user has "No Access" data export rights, they will not be able to use this method, and an error will be returned.

- **Export Instruments-Event Mappings**—This method allows you to export the instrument-event mappings for a project (Ex: how the data collection instruments are designated for certain events in a longitudinal project).
- **Import Instruments-Event Mappings**—This method allows you to import Instrument-Event Mappings into a project (this corresponds to the “Designate Instruments for My Events” page in the project).

- **Metadata**

- **Export Metadata (Data Dictionary)**—This method allows you to export the metadata for a project.
- **Import Metadata (Data Dictionary)**—This method allows you to import metadata (Ex: Data Dictionary) into a project. **Note:** Because of this method's destructive nature, it is only available for use for projects in **Development** status.

- **Projects**

- **Create Project**—This method allows you to create a new REDCap project. A 64-character Super API Token is required for this method (as opposed to project-level API methods that require a regular 32-character token associated with the project-user). In the API request, you must minimally provide the project attributes “project\_title” and “purpose” (with numerical value 0=Practice/Just for fun, 1=Other, 2=Research, 3=Quality Improvement, 4=Operational Support) when creating a project.

When a project is created with this method, the project will automatically be given all the project-level defaults just as if you created a new empty project via the web user interface, such as a automatically creating a single data collection instrument seeded with a single Record ID field and Form Status field, as well as (for longitudinal projects) one arm with one event. And if you intend to create your own arms or events immediately after creating the project, it is recommended that you utilize the `override=1` parameter in the “Import Arms” or “Import Events” method, respectively, so that the default arm and event are removed when you add your own. Also, the user creating the project will automatically be added to the project as a user with full user privileges and a project-level API token, which could then be used for subsequent project-level API requests.

**Note:** Only users with Super API Tokens can utilize this method. Users can only be granted a super token by a REDCap administrator (using the API Tokens page in the REDCap Control Center). Please be advised that users with a Super API Token can create new REDCap projects via the API without any approval needed by a REDCap administrator. If you are interested in obtaining a super token, please contact your REDCap administrator.

- **Export Project Info**—This method allows you to export some of the basic attributes of a given REDCap project, such as the project's title, if it is longitudinal, if surveys are enabled, the time the project was created and moved to production, etc.
- **Export Project XML**—The entire project (all records, events, arms, instruments, fields, and project attributes) can be downloaded as a single XML file, which is in CDISC ODM format (ODM version 1.3.1). This XML file can be used to create

a clone of the project (including its data, optionally) on this REDCap server or on another REDCap server (it can be uploaded on the Create New Project page). Because it is in CDISC ODM format, it can also be used to import the project into another ODM-compatible system. **Note:** All the option parameters listed below ONLY apply to data returned if the “returnMetadataOnly” parameter is set to FALSE (default). For this API method, ALL metadata (all fields, forms, events, and arms) will always be exported. Only the data returned can be filtered using the optional parameters.

**Note about export rights:** If the “returnMetadataOnly” parameter is set to FALSE, then please be aware that Data Export user rights will be applied to any data returned from this API request. For example, if you have “De-Identified” or “Remove all tagged Identifier fields” data export rights, then some data fields **might** be removed and filtered out of the data set returned from the API. To make sure that no data is unnecessarily filtered out of your API request, you should have “Full Data Set” export rights in the project.

- **Records**

- **Export Records**—This method allows you to export a set of records for a project. **Note about export rights:** Please be aware that Data Export user rights will be applied to this API request. For example, if you have “No Access” data export rights in the project, then the API data export will fail and return an error. And if you have “De-Identified” or “Remove all tagged Identifier fields” data export rights, then some data fields **might** be removed and filtered out of the data set returned from the API. To make sure that no data is unnecessarily filtered out of your API request, you should have “Full Data Set” export rights in the project.
- **Import Records**—This method allows you to import a set of records for a project.

- **Reports**

- **Export Reports**—This method allows you to export the data set of a report created on a project's “Data Exports, Reports, and Stats” page.

**Note about export rights:** Please be aware that Data Export user rights will be applied to this API request. For example, if you have “No Access” data export rights in the project, then the API report export will fail and return an error. And if you have “De-Identified” or “Remove all tagged Identifier fields” data export rights, then some data fields **might** be removed and filtered out of the data set returned from the API. To make sure that no data is unnecessarily filtered out of your API request, you should have “Full Data Set” export rights in the project. Also, please note the “Export Reports” method does **not** make use of the “type” (flat/eav) parameter, which can be used in the “Export Records” method. All data for the “Export Reports” method is thus exported in flat format. If the “type” parameter is supplied in the API request, it will be ignored.

- **REDCap**

- **Export REDCap Version**—This method returns the current REDCap version number as plain text (Ex: 4.13.18, 5.12.2, 6.0.0).

- **Surveys**

- **Export a Survey Link**—This method returns a unique survey link (Ex: a URL) in plain text format for a specified record and data collection instrument (and event, if longitudinal) in a project. If the user does not have “Manage Survey Participants” privileges, they will not be able to use this method, and an error will be returned. If the specified data collection instrument has not been enabled as a survey in the project, an error will be returned.

- **Export Survey Participants**—This method returns the list of all participants for a specific survey instrument (and for a specific event, if a longitudinal project). If the user does not have "**Manage Survey Participants**" privileges, they will not be able to use this method, and an error will be returned. If the specified data collection instrument has not been enabled as a survey in the project, an error will be returned.
- **Export a Survey Queue Link**—This method returns a unique Survey Queue link (Ex: a URL) in plain text format for the specified record in a project that is utilizing the Survey Queue feature. If the user does not have "**Manage Survey Participants**" privileges, they will not be able to use this method, and an error will be returned. If the Survey Queue feature has not been enabled in the project, an error will be returned.
- **Export a Survey Return Code**—This method returns a unique Return Code in plain text format for a specified record and data collection instrument (and event, if longitudinal) in a project. If the user does not have "**Manage Survey Participants**" privileges, they will not be able to use this method, and an error will be returned. If the specified data collection instrument has not been enabled as a survey in the project or does not have the "**Save & Return Later**" feature enabled, an error will be returned.
- **Users & User Privileges**
  - **Export Users**—This method allows you to export the list of users for a project, including their user privileges and also email address, first name, and last name. **Note:** If the user has been assigned to a user role, it will return the user with the role's defined privileges.
  - **Import Users**—This method allows you to import new users into a project while setting their user privileges, or update the privileges of existing users in the project.

## API Playground

The API Playground is an interface that allows experimentation with the REDCap API without actually writing any code. You can explore all the different API methods and their various options to customize a given API request. You may even execute a real API request and see the exact response that REDCap returns from the request. For details on the capabilities of the REDCap API and how to use it, please see the REDCap API documentation.

Once you have your API token, you can use the API Playground to “test drive” each API method and tweak the various options for each API method. You can run the method in your browser to see what type of response you'll get.

The API playground will also supply you with the code (including your API token & server URL) for that specific API method in the following languages:

- PHP
- Perl
- Python
- Ruby
- Java
- R
- cURL

You can copy and paste your chosen language code into your preferred scripting tool and run it there. We recommend the R program for demo purposes: it's free, light weight and will run on both

Windows and Mac environments. Another nice tool to "test" the API from your local computer is POSTMAN - a Chrome add-in which allows you to test and save API queries from your local computer.

## Dynamix Query (SQL)

The "SQL" field type allows one to populate a drop-down list on a REDCap project's data entry form or survey by providing an SQL query ("select" queries only) in the "Online Designer" for a field or in the Select Choices column of the "Data Dictionary".

### Online Designer:

### Data Dictionary:

Variable / Form Name	Section	Field Type	Field Label	Choices, Calculations, Field Note	Text Valid	Text Valid	Text Valid	Identifier	Branching	Required	Custom A
record_id_ice_cream		text	Record ID								
agree_to_ice_cream		radio	Do you agree to participate in this study?	1, Yes   2, No							
first_name_ice_cream		text	Enter your first name:								
email_address_ice_cream		text	Enter your email address:		email			y			
birthday_ice_cream		text	When is your birthday?		date_mdy					y	

Using an "SQL" field can allow you to simulate a one-to-many relationship from one REDCap project to another, or it can simply allow you to have a drop-down field populated with a dynamic list of choices. Any query can be used for an "SQL" field so long as the database table being queried exists in the same MySQL database as the REDCap tables. Also, **ONLY** REDCap super users may add or modify "SQL" field types either via the Data Dictionary or the Online Designer. You must know how to construct an SQL query in order to use this field type. **NOTE:** The only field in a project that cannot be set as an "SQL" field is the record ID field (Ex: the first field in the project).

### Advantages of SQL

The advantage of the "SQL" field type is that it allows you to populate a drop-down from a dynamic source (Ex: a database table) rather than a static source (Ex: the choices provided in the Select Choices metadata column). When constructing the query itself, only 1 or 2 fields may be used in the query (which must be a "select" query). If only one field exists in the SQL statement, the values retrieved from the query will serve as both the values AND the displayed text for the drop-down that is populated. If two fields are queried, the first field serves as the unseen values of the drop-down list while the second field gets displayed as the visible text inside the drop-down as seen by the user.

**Note:** If you are using an "SQL" field to query REDCap's data table (redcap\_data), remember that the table is an EAV model table, so it is not a flat table like an Excel spreadsheet, as is the data exported out of

REDCap in CSV format. So it may be necessary to use sub-queries or multiple joins in order to effectively provide limiters on your query to return the exact data you want.

## Examples of SQL

Here is an example of how one might query the redcap\_data table by using a sub-query inside the query to work as a filter so that it returns the record name and institution name for **only** the records that have a 'consortium\_status' value of '1'.

```
select record, value from redcap_data where project_id = 390 and field_name = 'institution'
```

```
and record in (select distinct record from redcap_data where project_id = 390 and field_name = 'consortium_status' and value = '1') order by value
```

But the query above could also be constructed instead using a JOIN rather than a sub-query.

```
select a.record, a.value from redcap_data a left join redcap_data b
```

```
on a.project_id = b.project_id and a.record = b.record and a.event_id = b.event_id
```

```
where a.project_id = 390 and a.field_name = 'institution'
```

```
and b.field_name = 'consortium_status' and b.value = '1' order by a.value
```

If the redcap\_data table were a "flat" formatted table (or if you are querying any kind of flat table), the query above might look something like the one below.

```
select auto_num, institution from FLAT_TABLE where project_id = 390 and consortium_status != '4'
```

```
order by auto_num
```

## Complex Example

Here is an example where we are bringing in a bunch of patient details into a dropdown in another project. It uses both CONCAT and CONCAT\_WS. CONCAT\_WS is nice because it will leave out any null parameters whereas CONCAT will return NULL if any part of the expression is NULL. So, if MRN is not defined for a record, it will not appear in the list.

```
SELECT a.record,  
CONCAT_WS(' | ',  
CONCAT('R: ', max(if(a.field_name = 'record_id', a.value, NULL))),  
CONCAT('MRN: ', max(if(a.field_name = 'mrn', a.value, NULL))),  
CONCAT_WS(' ',  
max(if(a.field_name = 'last_name', a.value, NULL)),  
max(if(a.field_name = 'first_name', a.value, NULL))  
) ,  
CONCAT('DOB: ', max(if(a.field_name = 'dob', a.value, NULL))),  
CONCAT('TX: ', max(if(a.field_name = 'tx', a.value, NULL))),  
CONCAT('DATE: ', max(if(a.field_name = 'date_tx', a.value, NULL))),  
CONCAT('ID: ', max(if(a.field_name = 'study_id', a.value, NULL)))  
) as value
```

```
FROM redcap_data a
WHERE a.project_id=1360
AND a.event_id=5854
GROUP BY a.record
ORDER BY a.record;

Close
```

## Calculated Fields

A calculated (“calc”) field can perform real-time calculations based on the data from other fields. REDCap has the ability to make real-time calculations on data entry forms. It is recommended that “calc” field types are not excessively utilized on REDCap data collection instruments. “Calc” fields should only be used when it is necessary to know the calculated value while on that page or the following pages, or when the result of the calculation affects data entry workflow. For example, you could create a calculation based off of the birthday field and date field in order to find out how old the participant was at the time of the survey.

**Field Type:** Calculated Field

**Question Number (optional)**  
Displayed only on the survey page

**Field Label** [How to use Piping](#)  
You are currently \_\_\_\_\_ years old.

**Calculation Equation** [How do I format the equation?](#)  
rounddown(datediff("today", [birthday], "y", "mdy"),0)

**Field Annotation (optional)** [Learn about Action Tags](#)  
We are only collecting data from people who are 18-60 years of age.  
Explanatory notes - not displayed on any page

**Variable Name (utilized during data export)**  
age  
ONLY letters, numbers, and underscores  Enable auto naming of variable based upon its Field Label?

**Required?\***  No  Yes  
\* Prompt if field is blank

**Identifier?**  No  Yes  
Does the field contain identifying information (e.g., name, SSN, address)?

**Custom Alignment** Right / Vertical (RV)  
Align the position of the field on the page

**Field Note (optional)**  
Small reminder text displayed underneath field

**Save** **Cancel**

## Format of Calculated Fields

In order for the calculated field to function, it will need to be formatted in a particular way. This is somewhat similar to constructing equations in Excel or with certain scientific calculators. The variable names/field names used in the project's Data Dictionary can be used as variables in the equation, but you must place [ ] brackets around each variable. (Ex: [favorite\_ice\_cream]) Please be sure that you follow the mathematical order of operations when constructing the equation or else your calculated results might end up being incorrect.

The mathematical operations available are:

+ Add

- Subtract

\* Multiply

/ Divide

**Null** or **blank** values can be referred to as "" or "**NaN**". Be careful to include the quotes around NaN.

## Data Import

Data cannot be directly imported into calculated fields. If you are importing data to a field you have set up to calculate a value, follow these steps:

1. Temporarily change the field type to text
2. Import data
3. Change the field type back to a calculated field

However, when performing a data import (via Data Import Tool or API), REDCap will perform the calculations for any calculated fields that are triggered by the values being imported. For example, if you have a BMI field whose calculation is based off of a height field and a weight field, then if you perform a data import of height and weight values, it will automatically calculate the BMI for each record that is imported and also save those calculations and log them on the Logging page.

## Conditional Logic

Conditional logic may also be used in a calculated field (Ex: an IF/THEN/ELSE statement) by using the function: **if (CONDITION, value if condition is TRUE, value if condition is FALSE)**

Note that all operands in CONDITION must be all numeric or all dates!

This construction is similar to IF statements in Microsoft Excel. Provide the condition first (e.g. [weight]=4), then give the resulting value if it is true, and lastly give the resulting value if the condition is false. For example:

```
if([weight] > 100, 44, 11)
```

In this example, if the value of the field 'weight' is greater than 100, then it will give a value of 44, but if 'weight' is less than or equal to 100, it will give 11 as the result.

IF statements may be used inside other IF statements ("nested"). Other advanced functions (described above) may also be used inside IF statements.

## Longitudinal Projects—Different EVENTS

In longitudinal projects, fields from different EVENTS can be used in calculated fields. A calculated field's equation may utilize fields from other events (Ex: visits, time-points). The equation format is somewhat different from the normal format because the unique event name must be specified in the equation for the target event. The unique event name must be prepended (in square brackets) to the beginning of the variable name (in square brackets), Ex: [unique\_event\_name][variable\_name]. Unique event names can be found listed on the project's "**Define My Events**" page on the right-hand side of the events table, in which the unique name is automatically generated from the event name that you have defined.

For example, if the first event in the project is named "Enrollment", in which the unique event name for it is "enrollment\_arm\_1", then we can set up the equation as follows to perform a calculation utilizing the "weight" field from the Enrollment event:

[enrollment\_arm\_1][weight]/[visit\_weight]. Thus, presuming that this calculated field exists on a form that is utilized on multiple events, it will always perform the calculation using the value of weight from the Enrollment event while using the value of visit\_weight for the current event the user is on.

## Add or Modify a Calculated Field

If you add a calculated field where data already exist in a form, the data must be re-saved for the calculation to be performed.

The Data Quality rule (rule H) will find and fix all incorrect values for calculated fields in a project. If any "calc" fields have ended up with incorrect values (whether due to field changes in the project or due to previous data imports), users can now run rule H not only to find any incorrect calculated values, but it will additionally display a button that, when clicked, will auto-fix ALL of them for the project admin.

## Calculate the Difference Between Two Date or Time Fields

You can calculate the difference between two dates or times by using the function:

**datediff([date1], [date2], "units", "dateformat", returnSignedValue)** date1 and date2 are variables in your project **units**

"y" years 1 year = 365.2425 days "M" months 1 month = 30.44 days "d" days

"h" hours

"m" minutes

"s" seconds

**dateformat**

"ymd" Y-M-D (default) "mdy" M-D-Y "dmy" D-M-Y

- If the dateformat is not provided, it will default to "ymd".
- Both dates MUST be in the format specified in order to work.

**returnSignedValue**

**false** (default) **true**

- The parameter returnSignedValue denotes the result to be signed or unsigned (absolute value), in which the default value is "false", which returns the absolute value of the difference. For example, if [date1] is larger than [date2], then the result will be negative if returnSignedValue is set to true. If returnSignedValue is not set or is set to false, then the result will ALWAYS be a positive number. If returnSignedValue is set to false or not set, then the order of the dates in the equation does not matter because the resulting value will always be positive (although the + sign is not displayed but implied).

Examples:

**datediff([dob],[date\_enrollee d],"d")** Yields the number of days between the dates for the date\_enrolled and dob fields, which must be in Y-M-D format

**datediff([dob],[date\_enrolled],"d")** must be in Y-M-D format

`datediff([dob],"05-31-2007","h","mdy",true`

Yields the number of hours between May 31, 2007, and the date for the dob field, which must be in M-D-Y format. Because `returnSignedValue` is set to true, the value

### Advanced Functions

The table below lists advanced functions for calculated fields:

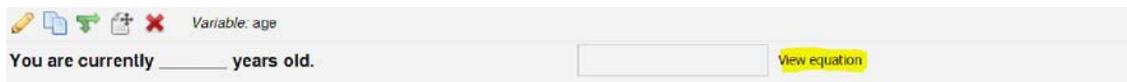
Function	Name/Type of Function	Notes/Examples
<code>if (CONDITION, VALUE if condition is TRUE, VALUE if condition is FALSE)</code>	<b>If/Then/Else conditional logic</b>	Return a value based upon a condition. If <code>CONDITION</code> evaluates as a true statement, then it returns the first <code>VALUE</code> , and if false, it returns the second <code>VALUE</code> . E.g. <code>if([weight] &gt; 100, 44, 11)</code> will return 44 if "weight" is greater than 100, otherwise it will return
<code>datediff ([date1], [date2], "units", "dateformat", returnSignedValue)</code>	<b>Datediff</b>	Calculate the difference between two dates or datetimes. Options for "units": "y" (years, 1 year = 365.2425 days), "M" (months, 1 month = 30.44 days), "d" (days), "h" (hours), "m" (minutes), "s" (seconds). The "dateformat" parameter must be "ymd", "mdy", or "dmy", which refer to the format of BOTH date/time fields as Y-MD, M-D-Y, or D-M-Y, respectively. If not defined, it will default to "ymd". The parameter "returnSignedValue" must be either TRUE or FALSE and denotes whether you want the returned result to be either signed (have a minus in front if negative) or unsigned (absolute value), in which the default value is FALSE, which returns the absolute value of the difference. For example, if [date1] is larger than [date2], then the result will be negative if returnSignedValue is set to TRUE. If returnSignedValue is not set or is set to FALSE, then the result will ALWAYS be a positive
<code>round(number,decimal places)</code>	<b>Round</b>	If the "decimal places" parameter is not provided, it defaults to 0. E.g. To round 14.384 to one decimal place: <code>round(14.384,1)</code> will yield 14.4
<code>roundup(number,decimal places)</code>	<b>Round Up</b>	If the "decimal places" parameter is not provided, it defaults to 0. E.g. To round up 14.384 to one decimal place: <code>roundup(14.384,1)</code> will yield 14.4
<code>rounddown(number,decimal places)</code>	<b>Round Down</b>	If the "decimal places" parameter is not provided, it defaults to 0. E.g. To round down 14.384 to one decimal place: <code>rounddown(14.384,1)</code> will yield 14.3
<code>sqrt(number)</code>	<b>Square Root</b>	E.g. <code>sqrt([height])</code> or <code>sqrt(([value1]*34)/98.3)</code>
<code>(number)^(exponent)</code>	<b>Exponents</b>	Use caret ^ character and place both the number and its exponent inside parentheses: For example, <code>(4)^(3)</code> or
<code>abs(number)</code>	<b>Absolute Value</b>	Returns the absolute value (i.e. the magnitude of a real number without regard to its sign). E.g. <code>abs(-7.1)</code> will return 7.1 and <code>abs(45)</code> will return 45.
<code>min(number,number,...)</code>	<b>Minimum</b>	Returns the minimum value of a set of values in the format <code>min([num1],[num2],[num3],...)</code> . NOTE: All blank values will be ignored and thus will only return the lowest numerical value. There is no limit to the amount

Function	Name/Type of Function	Notes/Examples
max(number,number,...)	<b>Maximum</b>	Returns the maximum value of a set of values in the format max([num1],[num2],[num3],...). NOTE: All blank values will be ignored and thus will only return the highest numerical value. There is no limit to the
mean(number,number,...)	<b>Mean</b>	Returns the mean (i.e. average) value of a set of values in the format mean([num1],[num2],[num3],...). NOTE: All blank values will be ignored and thus will only return the mean value computed from all numerical, non-blank values. There is no limit to the amount of
median(number,number,...)	<b>Median</b>	Returns the median value of a set of values in the format median([num1],[num2],[num3],...). NOTE: All blank values will be ignored and thus will only return the median value computed from all numerical, non-blank values. There is no limit to the amount of
sum(number,number,...)	<b>Sum</b>	Returns the sum total of a set of values in the format sum([num1],[num2],[num3],...). NOTE: All blank values will be ignored and thus will only return the sum total computed from all numerical, non-blank values. There is no limit to the amount of numbers used in this function
stdev(number,number,...)	<b>Standard Deviation</b>	Returns the standard deviation of a set of values in the format stdev([num1],[num2],[num3],...). NOTE: All blank values will be ignored and thus will only return the standard deviation computed from all numerical, non-blank values. There is no limit to the amount of

### Advanced Function Troubleshooting

When you have a problem with an advanced calculation not working, the equation may not be formatted correctly. You may try troubleshooting the equation by simplifying the equation first and then add functionality in steps as you test.

Another way to troubleshoot is to click “view equation” button.



All the variables you are referencing will be listed. If they are not, you will need to check and confirm the variable names.

**Calculation equation for variable "age"** ✕

**Variable Name:** age  
**Field Label:** You are currently \_\_\_\_\_ years old.  
**Calculation:** rounddown(datediff("today", [birthday], "y", "mdy"),0)

Fields Utilized in Calculation		
Variable Name	Field Label	Form Name
birthday	When is your birthday?	Ice Cream

Close

## Customizing Text

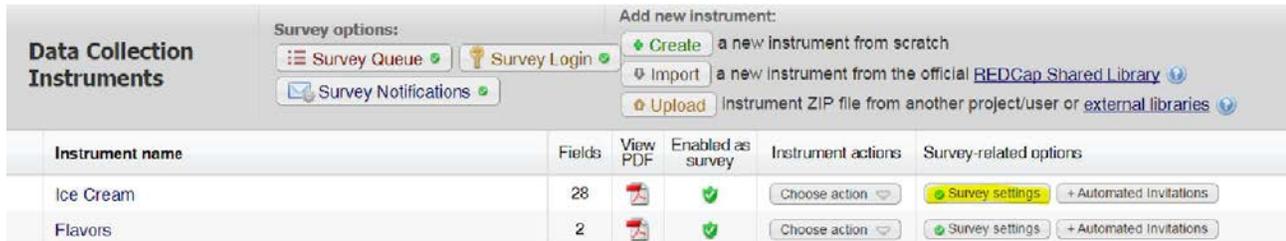
REDCap allows some customization of form appearance using HTML code. These include font size, font color, and spacing/indentation of field label text. Please note that not all HTML tags are honored by REDCap.

There are two areas where you can control fonts:

- the pre- and post-survey text (the text displayed at the beginning and end of your survey)
- the text of your survey questions and answers

### Pre and Post Survey Text

To control the fonts in the pre- and post-survey text, click the “**Survey settings**” button, found in the “**Online Designer**” screen.

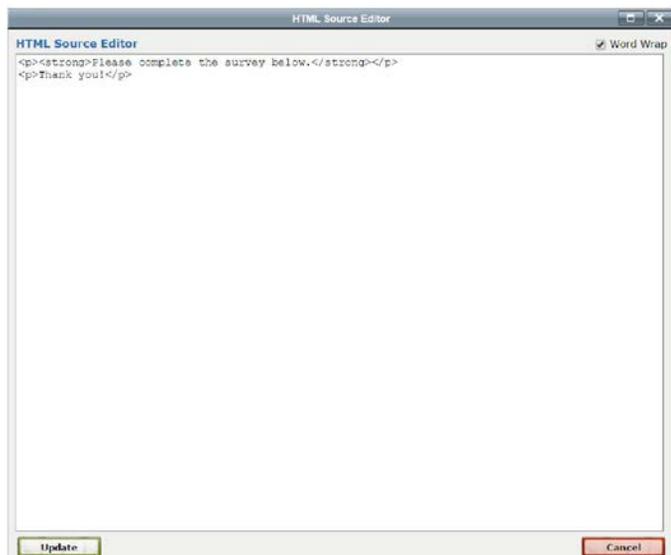


Instrument name	Fields	View PDF	Enabled as survey	Instrument actions	Survey-related options
Ice Cream	28			Choose action	<b>Survey settings</b> + Automated Invitations
Flavors	2			Choose action	Survey settings + Automated Invitations

When you click on the “**Survey settings**” button, various survey settings are displayed. In the “**Survey Instructions**” and the “**Survey Completion Text**” sections of that screen, several font control buttons are provided for making highlighted text bold, italic, underlined, and strike-through.



There is also an “**HTML**” button, when clicked displays an HTML source editor screen. This editor allows you to insert HTML tags into your regular text.



## Survey Questions and Answers

To control the fonts in the text of your survey questions and answers, insert HTML tags as you are editing your survey questions.

Only certain tags are recognized. The tags are enclosed with less than and greater than < brackets > and may be written in capital or lower case letters. When you start a tag, you must also close the tag with a backslash (/).

For controlling fonts, you can use the following:

`<span>. . .</span>`

For example, the following:

This will be `<span style="color: red; font-size: 20pt; font-style: italic;">red italic text of size 20</span>` and this is normal text.

will produce,

This will be *red italic text of size 20* and this is normal text.

Another example:

`<span style="margin-left: 10%;">This text will be indented by 10%.</span>`

will produce:

This text will be indented by 10%.

You may also use the following tags to define paragraphs, anchors (web links), and line breaks:

`<p> . . . </p>`

`<a> . . . </a>`

`<br>`

**Note:** that if you download your survey response data (Ex: for Excel, SPSS, etc.), any HTML tags that you inserted in your **answer** texts (Ex: for radio button answers) **will be included** in the answer texts that are downloaded. So you may want to limit your use of HTML tags in your answers. HTML tags used in your **question** texts will **not** be included in the download (they will be stripped out).

## Additional Tags

The following tags can be used:

`<b> bold </b>`

`<i> italics </i>`

`<u> underline </u>`

`<br>` break in the text

## Alignments

`<center>` close tag = `</center>`

**Font Sizes** close tag = `</font>`

`<font size=1>`

`<font size=2>`

<font size=3>

(Any # for font size)

**Font Colors** close tag =</font>

<font color="red">

<font color="blue">

<font color="green">

<font color="purple">

(Insert any color to test if it will work)

**To change font and size, you can write:**

<font size=3 color="red">

</font>

**Additional tags currently supported are:**

<p>	<img>	<td>
<a>	<span>	<tr>
<h3>	<div>	<th>
<h2>	<em>	<acronym>
<h1>	<strong>	
<hr>	<table>	

## Logging

The “**Logging**” application is where you can view audit trail information. (Ex: a log of data changes in your project) You can view and reconstruct a history of record creations, updates, deletions, and review the activity of your project users.

By clicking the “**Logging**” tool in the left-hand toolbar, you can view the entire audit trail throughout the life of the project. Each event’s category and specific change is listed along with the time/date and user’s username. The logging box is easily filterable, and can even be downloaded to a singular CSV file if need be.



The screenshot shows a filter interface for the Logging application. It includes several dropdown menus and input fields:

- Filter by event:** All event types (excluding page views) ▼
- Filter by user name:** All users ▼
- Filter by record:** All records ▼
- Displaying events (by most recent):** 1 - 100 ▼
- Filter by time range from:** Two date input fields with calendar icons, separated by the word "to".

Time / Date	Username	Action	List of Data Changes OR Fields Exported
12/01/2016 8:03am	mcdonaldd	Manage/Design	Download data import template
12/01/2016 8:03am	mcdonaldd	Manage/Design	Download data import template
12/01/2016 8:02am	mcdonaldd	Manage/Design	Download data import template
11/30/2016 10:22am	mcdonaldd	Manage/Design	Download data dictionary
11/30/2016 7:47am	mcdonaldd	Manage/Design	Edit project field
11/30/2016 7:45am	mcdonaldd	Manage/Design	Reorder project fields
11/30/2016 7:44am	mcdonaldd	Manage/Design	Reorder project fields
11/29/2016 2:45pm	mcdonaldd	Manage/Design	Reorder reports
11/29/2016 2:45pm	mcdonaldd	Manage/Design	Reorder reports
11/29/2016 2:39pm	mcdonaldd	Manage/Design	Download graphical chart for field
11/29/2016 2:34pm	mcdonaldd	Manage/Design	Download graphical chart for field
11/29/2016 2:34pm	mcdonaldd	Manage/Design	Download graphical chart for field
11/29/2016 1:11pm	mcdonaldd	Manage/Design	Edit report
11/29/2016 1:11pm	mcdonaldd	Manage/Design	Edit report
11/29/2016 1:10pm	mcdonaldd	Manage/Design	Create report
11/29/2016 11:06am	ONSSIPIRATE	Manage/Design	Request API token
11/29/2016 9:52am	ONSSIPIRATE	Manage/Design	Request API token
11/29/2016 9:51am	mcdonaldd	Updated User onssipirate	user = 'onssipirate'
11/29/2016 9:50am	mcdonaldd	User Removed from Role onssipirate	user = 'onssipirate', role = 'Data Entry 1'

The “**Logging**” report shows you all changes made to your project, including data exports, data changes, and the creation or deletion of users. (Ex: when changes were made, who made them, what kind of changes were made). If a user is adding or changing data, REDCap will show you what the change was and which record it was in. You can also filter the log by the type of events.

**Note:** You can see when people have created users and have created roles; or deleted or updated them, you can see where data has been put in records, and then you can see record created/updated only, and it also shows record locking and e-signature and page views.

You can use this to track what a specific user has done, or you can use it track the history of a specific record. The logging feature is a very useful tool if you are trying to backtrack how something was created or maybe where something went wrong in your project.

You can also download the entire logging record, by clicking on the  **Download entire logging record to Microsoft Excel (CSV)** link. Just remember that this may take some time for large or very active projects.

## Reports

Using the “**Data Exports, Report, and Stats**” application, you can build and save reports that query in real-time. You may also create your own custom reports in which you can filter the report to specific fields, records, or events using a vast array of filtering tools to make sure you get the exact data you want. You may add as many fields to your report as you wish and you can choose which users may view this report.

### Create New Report

1. To create a new report, click on the “**+ Create New Report**” button.
2. Enter a name for the report. This name will be listed in the Reports section of the project’s left-hand menu and available for anyone you have given access.
3. Indicate the users who should be able to access the report:
  - a. All users
  - b. Selected users specified by name
  - c. All users from a particular user roles
  - d. All users from a particular data access groups
4. Specify the fields to include in the report.

**STEP 2**

**Fields to include in report** Quick Add Add all fields from selected instrument: -- choose instrument --

Field 1	record_id "Record ID"	Instrument: Ice Cream	X
Field 2	Type variable name or field label		

**Additional fields to include in report (optional)**

Include the Data Access Group name for each record (if record is in a group)?

Include the survey identifier field and survey timestamp field(s)?

**Note:**

- If your list of fields is very long it can be easier to find them by clicking the button and opting to have a text entry box with an autocomplete dropdown.
- You may reorder fields by dragging a field to a new position.
- You can remove fields by using the red

5. Specify a filter for the records (optional)

**STEP 3**

Show data for all events for each record returned ? [How to use filters and AND/OR logic](#)

**Filters (optional)** **Operator / Value**

Filter 1: Type variable name or field label in All events =

**Additional Filters (optional)** (Records belonging only to ALL selections below will appear in the report)

Filter by event(s): Event 1 (Arm 1: Flavors), Event 2 (Arm 1: Flavors), Event 3 (Arm 1: Flavors), Event 4 (Arm 2: Treats), Event 5 (Arm 2: Treats), Event 6 (Arm 2: Treats)

Filter by DAG(s): Health Sciences Group

**Live Filters (optional)** Live Filters can be selected on the report page for dynamically filtering data in real time. Only multiple choice fields can be used as Live Filters (as well as Events, if longitudinal, and Data Access Groups, if any exist).

Live Filter 1: -- select a field --

Live Filter 2: -- select a field --

Live Filter 3: -- select a field --

You can apply straightforward filters by selecting the relevant fields and specifying an operator (Ex: “equals”) and a value to match. For complex expressions involving functions or requiring parentheses, click “Switch format: Use advanced logic” to write your filter expressions. The syntax for the expression follow the same rules as for calculated fields and branching logic.

6. Specify up to three of the report fields by which the records will be sorted (optional) which shows you the order of the results which you can set by setting different parts of the

**STEP 4**

**Order the Results (optional)**

First by	record_id "Record ID"	Ascending order
Then by	Type variable name or field label	Ascending order
Then by	Type variable name or field label	Ascending order

Save Report Cancel

7. When you are finished, click the “Save Report” button at the bottom. The new report will then be added to your list of reports, after which you may immediately begin viewing them or exporting them. Reports are also listed in their own section of the left-hand menu and are available directly from any project page for anyone you have given access.

**Managing and Using Your Reports**

The “My Reports & Exports” tab displays the two built-in reports and any that have been created for your

project.

My Reports & Exports				
	Report name	View/Export Options	Management Options	Report ID (auto-generated)
A	All data (all records and fields)	<a href="#">View Report</a> <a href="#">Export Data</a> <a href="#">Stats &amp; Charts</a>		
B	Selected instruments and/or events (all records)	<a href="#">Make custom selections</a>		
1	Ice Cream Report	<a href="#">View Report</a> <a href="#">Export Data</a> <a href="#">Stats &amp; Charts</a>	<a href="#">Edit</a> <a href="#">Copy</a> <a href="#">Delete</a>	125
<a href="#">+ Create New Report</a>				

The table supports the following tasks:

1. **View Report**—Run the report and display the results in a table on the screen.
2. **Export Data**—Select an export format (Excel/CSV, SAS, SPSS, R, or Stata) and any de-identification options and download report data in CSV format, plus a syntax file for the stats package option.
3. **Stats & Charts**—View plots and summary stats for each variable in the report. It does not enable you to define your own summaries, such as tabulations of two fields. How the summary data is presented varies according to the field type:
  - a. Categorical fields: Summarized in bar charts
  - b. Numeric fields: Summarized in scatter plots. This can be of assistance in identifying outliers. Click on a data point to navigate to the specific record.
  - c. Text fields: You see simple totals for the number of records that have data and the number of records where the value is missing.
4. **Edit**—Return to the edit screen to make changes to the design of the report.
5. **Copy**—Create a new report as a copy of the report selected. A new title must be entered and you may then make alterations to other aspects of the new report’s setup (allowed users, fields, record filter, sort).
6. **Delete**—Remove the report. **Note:** There is no Undo!
7. **Reorder Report List**—You can reorder the list of reports you have created (the built-in reports stay on top) by hovering over the left-hand column of the table of reports and dragging a row in the table to a new position.

## Project Status

There are five categories also known as project statuses of a project. A project can exist in one of the following five categories at any given time:

### Development

All projects when first created start in **Development**. In Development, you can design, build, and test your REDCap projects. All design decisions can be made in real time and are implemented immediately to your project. All survey and data entry features/functions can and should be tested. In this phase, no real data is entered. If you are conducting a research study, your IRB number is not required until you move into Production mode.

### Production

From Development, you will move your project to **Production**. At this point, you should have fully tested the workflow, data validation and branching logic. You should be certain that your data forms are finalized and fully functional. You should also have your IRB approval number, if applicable. If it was not added to your project initially, you may add it under “**Modify project title, purpose, etc.**” on the main project

dashboard. When you are ready to deploy your project, you will request to have your project moved into **Production** mode by clicking the button on the Project Setup page. This will send a notification to the REDCap Administrator that you are ready to deploy your project. Once your project is approved for Production, you will receive an email alerting you of your project's new status. By default, moving a project to Production erases all existing practice records, calendar events, and all other associated practice data. All survey and data entry features/functions will be the same as they are in development with the exception of certain Project Setup features. In this phase, real data is collected. Moving your project to Production prior to collecting real study data ensures you are maintaining data accuracy and integrity.

## Draft

When you enter production mode and find that you need to modify an element of your data entry forms, you may enter Draft Mode and submit the changes. Changes to your project configuration and setup are possible, but should be minor and infrequent. Some project and form design updates will require contacting a REDCap Administrator and/or submitting data collection instrument changes in Draft Mode. Changes to data collection instruments in Draft Mode are not made to your project in real time. After making updates, you must submit the changes for review. Review and approval time are typically done in two business days. This post-production control process provides an additional check to ensure that data in your records are not modified, deleted, or overwritten unintentionally.

From Production, you can move the projects in the following status on the Project Setup > Other

Functionality page: [Inactive](#)

**Inactive** mode is only available once a project is already in Production mode; it is not available in Development mode. Under the **"Other Functionality"** tab of the project dashboard, you can move your project to inactive status. Ideally, you would move the project to inactive status when data collection is complete, but you would still like to export and analyze the records you have collected. This will disable most project functionality, including access to individual records, but the data will remain available for export and analysis. In this phase, the project is essentially complete. Your project will still be accessible from your My Projects List, but you will see a red **"Inactive"** icon next to it. Once inactive, the project can be moved back to production status at any time by clicking the **"Other Functionality"** tab and click **"Move to production status"**. Since your project was already approved for Production, it does not need another approval; it will be immediately placed back in Production.

## Archive

Once you are finished with a project, you may archive it. Unlike the Inactive mode, a project can be moved to Archive mode whether it is in Development or Production mode. You can also move a project into Archive mode directly from Inactive mode. Move the project to archive mode if data collection is complete and/or you no longer wish to view it on My Projects List. Similar to Inactive mode, this will disable most project functionality. The project can only be accessed again by clicking the **Show Archived Projects** link at the bottom of the My Projects page. Once archived, the project can be moved back to production mode at any time by clicking the **"Other Functionality"** tab and click **"Move to production status"**.

**Note:** Only users that have Project Design and Setup permissions can accomplish transitions of the project status. A project may not necessarily progress through these categories in sequence. Some such as "Practice" projects may never reach production; others may be archived directly once the Production phase is complete.

## Test Your Project Thoroughly

It is extremely important to test your project before moving it into production! The purpose of testing

your database is to ensure that it has the structure and integrity checks that you expect and that it meets your requirements. Entering practice data will often lead to more instrument changes.

Testing a database means doing much more than simply verifying that it contains the desired fields: you need to verify that each field has the appropriate properties (data type, allowed range, allowed values) and that cross-field data validations work as you expect. Make sure you create test records and enter some data to ensure that your data collection instruments look and work how you expect, especially branching logic and calculations. You can do this by clicking “Add/Edit Records” in the Data Collection section. If you have surveys, complete the surveys as if you were a participant by using the Public Survey Link.

The screenshot shows the REDCap interface for the 'Ice Cream Project for Training'. The left sidebar contains navigation options: 'My Projects or Control Center', 'Project Home', 'Project Setup', 'Data Collection', 'Manage Survey Participants', 'Record Status Dashboard', and 'Add / Edit Records'. The main content area shows the project name, a list of actions including 'Download PDF of instrument(s)' and 'VIDEO: Basic data entry', and a section for 'Ice Cream' data collection. This section displays 'Total records: 0 / Total survey responses: 0 / Last survey response: survey not yet taken' and includes dropdown menus for 'Partial Responses (0)' and 'Complete Responses (0)', along with an 'Add new record' button. A link for 'Show Unverified Records above' is visible at the bottom right of the data collection section.

Once you have some test records entered, review them by going to your “Record Status Dashboard”; create reports and export your data and view in Excel or one of the statistical analysis packages; review your Stats.

**Note:** It is recommended that you export your test data for review prior to moving your project into Production.

The best way to test your project is to use it as if you were entering real production data, and it is always helpful to have colleagues (especially team members) take a look at your project to get a fresh set of eyes looking at it.

## Move Your Project to Production

When you are ready to begin entering real data, use the Project Setup tab to move the project to production status. Once in production, you will not be able to edit the project fields in real time. However, you can make edits in Draft Mode, which will then need to be approved by a REDCap administrator before taking effect.

You are strongly encouraged to test your project thoroughly before you move your project into Production. Once you have ensured your project is capturing all of the fields you need and has all of the design elements, click on the Move project to production icon.

The image shows a button with a red 'X' icon and the text 'Not started'. Below the icon, the text reads: 'Move your project to production status'. Underneath, a detailed instruction states: 'Move the project to production status so that real data may be collected. Once in production, you will not be able to edit the project fields in real time anymore. However, you can make edits in Draft Mode, which will then need to be approved by a REDCap administrator before taking effect.' At the bottom, there is a 'Go to' label followed by a yellow button labeled 'Move project to production'.

## Move Project To Production Status?

Are you sure you wish to leave the DEVELOPMENT stage? If you proceed, the project will be moved to PRODUCTION status so that real data may be collected. If you select the 'Delete ALL data' option below, all current collected data, calendar events, and uploaded documents will be deleted, otherwise all will remain untouched as the project is moved to production.

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

### Keep existing data or delete?

- Keep ALL data saved so far.
- Delete ALL data, calendar events, documents uploaded for records/responses, survey responses (if applicable), and any logging events pertaining to data collection.

Once in production, you will not be able to edit the project fields in real time anymore. However, you can make edits in Draft Mode, which will be auto-approved or else might need to be approved by a REDCap administrator before taking effect.

YES, Move to Production Status

Cancel

**Note:** Moving a project from development mode to production mode is done by the REDCap Administrator.

The screenshot displays the REDCap user interface for a project named "DEMONSTRATION PROJECT". The left sidebar shows the user is logged in as "red\_0004" and provides navigation options for "My Projects", "Data Collection", and "Applications". The main content area features a navigation bar with "Project Home", "Project Setup", "Other Functionality", and "Project Revision History". A prominent green success message states: "Success! The project is now in production." Below this, the "Project status" is confirmed as "Production". The "Main project settings" section includes a "Complete!" indicator and a note that some options are disabled in production. Two disabled options are visible: "Use longitudinal data collection with repeating forms?" and "Use surveys in this project?". A "Modify project title, purpose, etc." button is also present. A video link for "How to create and manage a survey" is provided.

Production mode looks much like development mode, but production has extra precautions to protect saved data. All survey and data entry features/functions will be exactly the same as they are in development with the exception of certain Project Setup features.

The Online Designer and Data Dictionary can still be used to modify instruments. You can only make edits in Draft Mode, which will then need to be approved by a REDCap administrator before taking effect.

 **Modify your data collection instruments in Draft Mode**

Once in production, you may still modify or add fields to the project, if you desire. This may be done by either using the Online Designer (online method) or by uploading a Data Dictionary (offline method), in which you may use either method or both. Quick links: [Download PDF of all data collection instruments](#) OR [Download the current Data Dictionary](#)

Go to  or

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

Enter Draft mode to make and submit changes to the instruments.

**NOTE:**  
The project is currently in PRODUCTION status, and thus changes cannot be made in real time to the project as when in Development status. However, changes to the project may be drafted in DRAFT MODE, after which such changes will be reviewed and approved by a REDCap administrator. Once those changes are approved, you will then receive an email confirmation informing you that those changes have taken effect on your production project.

[Share your instruments with others via the REDCap Shared Library](#)

**Would you like to enter DRAFT MODE to begin drafting changes to the project?**



## Additional Training/Support Resources

If you have questions or need additional training, please [email redcap@ecu.edu](mailto:redcap@ecu.edu)