



REDCap: Beyond Forms

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Collaborative Data Services (CDS)

Agenda

- Importing Data
- Reports and Exporting Data
- Security
- REDCap's Audit Trail (Logging)
- Data Quality Rules

Importing Data

Importing Data – Three Basic Steps

1. Download the CSV Import Template file
2. Get your data into the template file
3. Import the data into REDCap

1. Download the CSV Import Template File

Data Import Tool

This module may be used for importing data into this project from a CSV (comma delimited) file. Below are the steps you will need to follow in order to import your data successfully into this project.

Instructions:

- 1.) Click the link below 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)

2. Get your data into the template file

- Use Excel or a text editor
- Be careful not to save to the Excel format
- Leave any fields you do not wish to update blank
- You must have the following fields
 1. First column: record id field
 2. In a longitudinal study, the second column must be redcap_event_name. Values must be the unique event name listed on Define My Events page
- The optional form_complete field can have the following values
 - 0 = incomplete
 - 1 = unverified
 - 2 = complete

3. Import the data into REDCap

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

Rows 

Format for date and datetime values:

MM/DD/YYYY or YYYY-MM-DD 

Allow blank values to overwrite existing saved values?

No, ignore blank values in the CSV file (default) 

 Upload your CSV file:

Choose File PaulLongitu...5-09-23.csv

Upload File

After clicking Upload File...

- REDCap reports warnings, errors, or that everything went okay, but you are not done

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

- Important: Scroll down to bottom of page & click [Import Data](#) to commit

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

Importing data – Additional Considerations (1 of 2)

- If the project has existing data and you want to completely replace the records, you will need to delete all the records first using [Project Setup | Other Functionality](#)
- If you wish to update selective records, then don't delete anything first but do pay attention to the [Allow blank values to overwrite existing saved values](#) Option
- If you have date fields and are using European date format (with days first), you will want to adjust the [Format for date and datetime](#) values option
- You can import records with the data stored as columns instead of rows
 - Download the columns template and adjust the Record format when uploading

Importing data – Additional Considerations (2 of 2)

- If your project uses repeating instruments/events, then the import template will include additional fields
- This is discussed in more detail in **RC205: Collecting data in REDCap at multiple timepoints** seminar

Reports and Exporting Data

Reports and Exporting Data

- REDCap unifies the concepts of reporting and exporting
 - All reports and exports start with a report
 - Then you either print the report or export the data behind the report

Reports module also supports creating PDF of all data forms for all participants

Creating a Report

 [+ Create New Report](#)

 [My Reports & Exports](#)

 [PDF & Other Export Options](#)

This module allows you to easily view reports of your data, inspect plots and descriptive statistics of your data, as well as export your data to Excel, SAS, Stata, R, or SPSS for analysis (if you have such privileges). If you wish to export your *entire* data set or view it in a format that is the best and quickest way. However, if you want to view or export data from only specific instruments (or events) on the fly, you have the choice. You may also create your own custom reports below (if you have such privileges) in which you can filter the report to only include specific events using a vast array of filtering tools to make sure you get the exact data you want. Once you have created a report, you can view it or export it out of REDCap in a specified format (Excel, SAS, Stata, SPSS, R), or view the plots and descriptive statistics for the data.

My Reports & Exports

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

Creating a Report

Give it a name

Who can run report?

Select fields to include

Filter records to include

Sort the report

Name of Report:

STEP 1

User Access: Choose who sees this report on their left-hand project menu ?

All users - OR - Custom user access (Choose specific users, roles, or data access groups who will have access)

STEP 2

Fields to include in report [Quick Add](#) Add all fields from selected instrument: -- choose instrument --

Field	Field Label	Instrument
Field 1	subject_id "Subject ID"	Enrollment
Field 2	Type variable name or field label	

STEP 3

Filters (optional) [How to use filters and AND/OR logic](#)

Filter	Field Label	Operator	Value
Filter 1	Type variable name or field label	=	

Switch format: [Use advanced logic](#)

STEP 4

Order the Results (optional)

Order	Field Label	Order
First by	subject_id "Subject 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](#)

New Feature: Live Report Filter

- Allows you to filter on a categorical (multiple choice) field whose value can be chosen when the report is run!



[+ Create New Report](#)
[My Reports & Exports](#)
[Other Export Options](#)
[View](#)

Number of results returned: **2**
 Total number of records queried: 6

Stats & [Gender] Report
 Live filters: ✓ Female Reset
 (blank value)

All Subjects (with Live Filter)

Subject ID (subject_id)	Date Enrolled (enr_date)	Gender (enr_gender)	Date of birth (enr_birth_date)	Today's Date (bas_date)	Height (in inches) (bas_height)	Weight (in pounds) (bas_weight)	Smoking status (bas_smoking_status)
<u>2</u>	09-24-2014	Female (2)	04-16-1950	09-24-2014	55	132	Former smoker (2)
<u>4</u>	09-26-2014	Female (2)	04-19-1980	09-26-2014	72	190	Never smoked (1)

Exporting Data (1 of 3)

- First create the report, or simply run built-in [All Data](#) report
- Run the report and click [Export Data](#)

Exporting Data (2 of 3)

- Choose export format
- And optional options
- Click [Export Data](#)

Exporting "All data (all records and fields)"

Select your export settings, which includes the export format (Excel/CSV, SAS, SPSS, R, Stata) and whether or not to perform de-identification on the data set.

Choose export format

-  CSV / Microsoft Excel (raw data)
-  CSV / Microsoft Excel (labels)
-  SPSS Statistical Software
-  SAS Statistical Software
-  R Statistical Software
-  Stata Statistical Software

De-identification options (optional)

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

Known Identifiers:

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

Free-form text:

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

Date and datetime fields:

- Remove all date and datetime fields

— OR —

- Shift all dates by value between 0 and 364 days (shifted amount determined by algorithm for each record) [What is date shifting?](#)

[Deselect all options](#)

Export Data **Cancel**

Exporting Data (3 of 3)

- Click icon(s) to complete download

✓ **Data export was successful!** ✕

The data export was successful, and your data is now ready to be downloaded. Click the download icon(s) below on the right to download your data file. If exporting to a specific statistical analysis package, you will additionally need to download the syntax file that is provided for that stats package. For more details, follow the instructions in the box below.

Citation Notice

Please **cite the REDCap project when publishing manuscripts** (citation information and template methods language are [available here](#)).

 **CSV / Microsoft Excel (raw data)**

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

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

Click icon(s) to download:

 **EXCEL CSV Raw**

 [Send file?](#)

Close

De-identification during export

De-identification options (optional)

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

Known Identifiers:

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

Free-form text:

- Remove unvalidated Text fields (i.e. Text fields other than dates, numbers, etc.)
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Date and datetime fields:

- Remove all date and datetime fields

— OR —

- Shift all dates by value between 0 and 364 days
(shifted amount determined by algorithm for each record)

[What is date shifting?](#)

[Deselect all options](#)

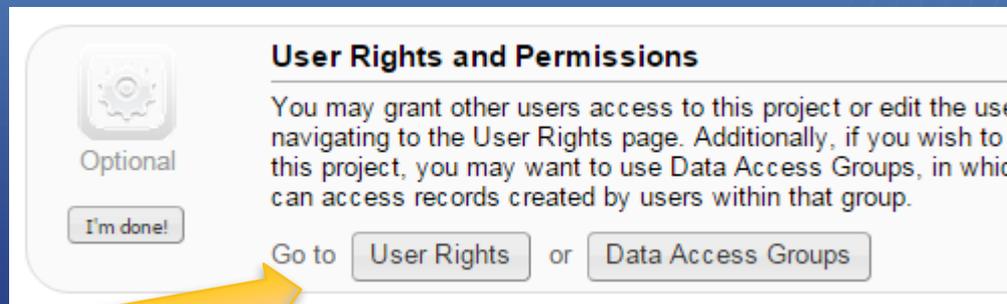
Exporting data – Additional Considerations

- If your project is longitudinal or uses repeating instruments, then the exported data will include additional fields that indicate the event or repeating instrument number
- This is discussed in more detail in **RC205: Collecting data in REDCap at multiple timepoints** seminar

Security

REDCap Security

1. REDCap Admin creates user account in **Control Center**
2. Project security admin grants user rights to a project in **Project Setup**
 - User rights can be granted to a user or a role
 - Using roles eases rights management
 - Fred Hutch uses a template to create new projects with a set of pre-defined roles that can be adjusted



User Rights and Permissions

You may grant other users access to this project or edit the user rights by navigating to the User Rights page. Additionally, if you wish to use Data Access Groups for this project, you may want to use Data Access Groups, in which users can access records created by users within that group.

Go to or

REDCap Users, Roles, & Permissions (1 of 2)

Project Setup
User Rights
Data Access Groups

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

— OR —

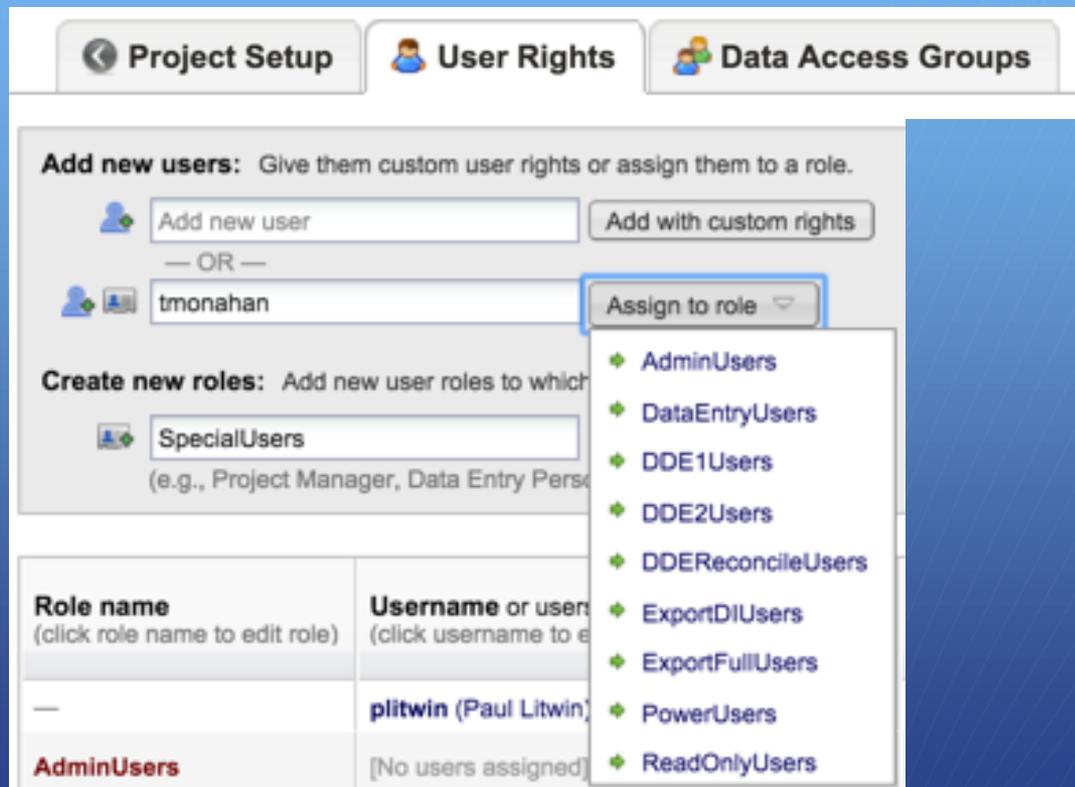
Create new roles: Add new user roles to which users may be assigned.

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

Role name (click role name to edit role)	Username or users assigned to a role (click username to edit or assign to role)	Expiration (click expiration to edit)	Project Design and Setup	User Rights	Data Access Groups	Data Export Tool	Reports & Report Builder
—	plitwin (Paul Litwin)	never	✓	✓	✓	Full Data Set	✓
AdminUsers	[No users assigned]		✓	✓	✓	Full Data Set	✓
DataEntryUsers	[No users assigned]		✗	✗	✗	✗	✗
DDE1Users	[No users assigned]		✗	✗	✗	✗	✗
DDE2Users	[No users assigned]		✗	✗	✗	✗	✗
DDEReconcileUsers	[No users assigned]		✗	✗	✗	De-Identified	✗
ExportDIUsers	[No users assigned]		✗	✗	✗	De-Identified	✓
ExportFullUsers	[No users assigned]		✗	✗	✗	Full Data Set	✓
PowerUsers	[No users assigned]		✓	✓	✓	Full Data Set	✓
ReadOnlyUsers	[No users assigned]		✗	✗	✗	✗	✗

REDCap Users, Roles, & Permissions (2 of 2)

- Assigning a user to a role
- Note: A user can only be a member of 1 role (or no roles)



The screenshot shows the 'User Rights' tab in the REDCap interface. It features three main sections: 'Add new users', 'Create new roles', and a table of existing roles.

Add new users: Give them custom user rights or assign them to a role. This section includes a text input for 'Add new user', a button 'Add with custom rights', and a dropdown menu 'Assign to role' which is currently open, showing a list of roles: AdminUsers, DataEntryUsers, DDE1Users, DDE2Users, DDEReconcileUsers, ExportDIUsers, ExportFullUsers, PowerUsers, and ReadOnlyUsers.

Create new roles: Add new user roles to which. This section includes a text input for 'SpecialUsers' and a note '(e.g., Project Manager, Data Entry Person)'. There is also a small icon of a person with a plus sign.

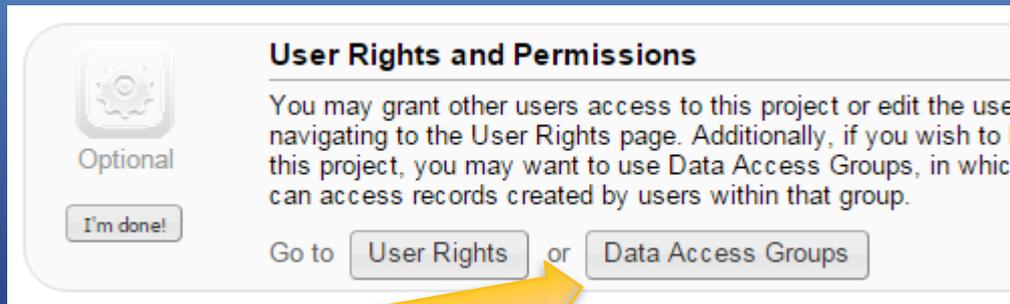
Role name (click role name to edit role)	Username or users (click username to edit)
—	plitwin (Paul Litwin)
AdminUsers	[No users assigned]

Keeping REDCap & YOUR Data Secure

- It's important to let us know (redcaphelp@fredhutch.org) when a user on a project leaves your group or the Hutch so we can suspend their account

Data Access Groups

- What are they?
 - A way to segment users so that each group only has access to *their* records
 - Common way to implement *sites* in a multi-site trial
- How to enable?
 - Under Project Setup



 **User Rights and Permissions**

Optional

[I'm done!](#)

You may grant other users access to this project or edit the user rights by navigating to the User Rights page. Additionally, if you wish to use Data Access Groups, in which users can access records created by users within that group.

Go to [User Rights](#) or [Data Access Groups](#)

Data Access Groups

- Users assigned to a Data Access Group (DAG) are limited in which records they can view or edit
- All project users not in a DAG have access to all records
- A record is assigned to a DAG automatically by user who creates the record
- A record can also be assigned to a DAG when the record is imported
- Note: A user can only be a member of 0 or 1 DAGs (never more than 1)

Data Access Groups

- Assigning users to DAGs

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>	Data Access Group <small>(click DAG to assign user)</small>
DataEntryUsers	bs_umn_user (Biomarkers UMN) [account suspended]	01/19/2015	UMN
	grundahlk (Kiely Grundahl)	never	OMRF
	hunterl (Laura Battiest)	never	OMRF
	jmbaldi (Judith Baldi)	never	UMCG
	judy-harris (Judy Harris)	never	OMRF

Assign user to a group:

OMRF

REDCap's Audit Trail

Audit Trail (Log)

- Click on the **Logging** link under Applications
- Here you can see the entire log for the project and filter it by...
 - Types of events
 - User
 - By record
 - By date range
- Log can be exported

Logging [Download entire logging record to Microsoft Excel \(CSV\)](#)

This module lists all changes made to this project, including data exports, data changes, and the creation or deletion of users.

Filter by event: All event types (excluding page views) ▾
 Filter by user name: All users ▾
 Filter by record: All records ▾
 Filter by time range from: to
 Displaying events (by most recent): 1 - 100 (Page 1 of 4) ▾

Time / Date	Username	Action	List of Data Changes OR Fields Exported
10/10/2017 11:02am	plitwin	Manage/Design	Download data dictionary
10/04/2017 2:35pm	plitwin	Manage/Design	Make project customizations
09/14/2017 2:23pm	plitwin	Manage/Design	Click project bookmark
09/14/2017 2:23pm	plitwin	Manage/Design	Edit project bookmark
09/14/2017 2:22pm	plitwin	Manage/Design	Click project bookmark
09/14/2017 2:22pm	plitwin	Manage/Design	Edit project bookmark
09/14/2017 2:19pm	plitwin	Manage/Design	Click project bookmark
09/14/2017 2:19pm	plitwin	Updated Record 3	feeling = "
09/14/2017 2:19pm	plitwin	Manage/Design	Click project bookmark
09/14/2017 2:19pm	plitwin	Manage/Design	Create project bookmark
08/25/2017 12:10pm	plitwin	Manage/Design	Click project bookmark
08/24/2017 2:41pm	plitwin	Manage/Design	Click project bookmark
08/24/2017 2:38pm	plitwin	Manage/Design	Click project bookmark
08/09/2017 12:35pm	plitwin	Manage/Design	Upload data dictionary
08/09/2017 12:32pm	plitwin	Manage/Design	Download data dictionary
08/09/2017 11:57am	plitwin	Download uploaded document Record 1	file_upload

Audit Trail (Log)

- You can also click on the H (for history) next to any field to bring up the audit trail for that particular field

Identifier given by group who acquired the sample



i.e., RO40004 is a repository identifier for Protocol 1690 repository

Data History for variable "acquisition_id" for record "2"

Listed below is the history of all data entered for the variable "acquisition_id" for DHArMA Project ID "2". The data history results are sorted from earliest to most recent.

Date/Time of Change	User	Data Changes Made
10/03/2016 4:57pm	jlsmith	NC-24B
10/06/2016 10:02am	apaguiari	
10/06/2016 11:12am	apaguiari	NC-24B

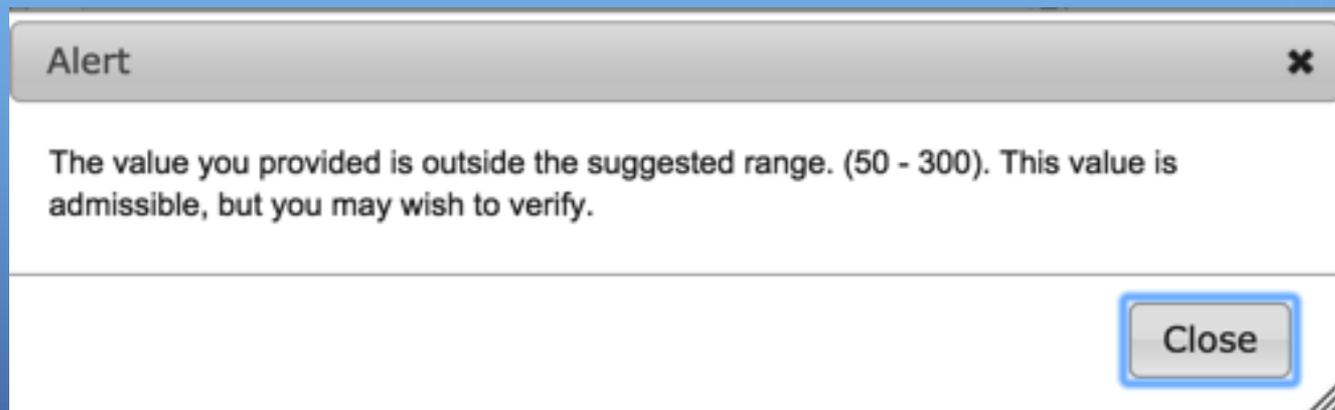
Close

Data Quality Rules

What are Data Quality Rules and why use them?

- What are Data Quality Rules?
 - A mechanism for applying validation logic to data that has already been collected
 - Can be run regularly
 - Can be run manually or automatically (real time execution)
- Why use them?
 - Standard REDCap validation is not absolutely enforced
 - Standard REDCap validation is simplistic
 - You may have rushed to get project launched without complete validation
 - Data cleaning

Reason for using Data Quality Rules: REDCap Field Validation can be overridden



Creating a Simple Data Quality Rule

Add	Baseline Interview Height should be between 48 and 84 inches	[bas_height] < 48 or [bas_height] > 84
	Enter descriptive name for new rule (e.g., Participants below age 18)	Enter logic for new rule (e.g., [age] < 18)

This will become the error message. Either tell them what are good values **or** what are bad values (but try to be consistent across the project)!

This is the expression that, when satisfied, will trigger the error. IOW, this defines **bad** values.

Running Data Quality Rules

Data Quality Rules		Execute rules: All All except A&B All custom Clear			Apply to: -- All records --	Total Discrepancies	Delete rule?
Rule #	Rule Name	Rule Logic (Show discrepancy only if...)	Real-time execution				
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, calc 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	Baseline Interview Weight is not between 50 and 300 pounds	[bas_weight] < 50 or [bas_weight] > 300	<input type="checkbox"/>		Execute	<input checked="" type="checkbox"/>	

Creating Data Quality Rules using the DateDiff Function

BirthDate can't be after Enrollment date

```
datediff([enr_birth_date], [enr_date], "y",  
"mdy", true) > 100
```

Birth date can't be less than 18 years prior to enrollment

```
datediff([enr_birth_date], [enr_date], "d",  
"mdy", true) < 18
```

3-month follow-up less than 90 days or more than 115 days after enrollment

```
datediff([enr_date],[fu3_date],"d",  
"mdy",true) > 115 or datediff([enr_date],  
[fu3_date],"d", "mdy", true) < 90
```

Creating Data Quality Involving Multiple Fields in Longitudinal Studies

- Last rule (from previous slide) in a Classic project

3-month follow-up less than 90 days or more than 115 days after enrollment

```
datediff([enr_date],[fu3_date],"d",  
"mdy",true) > 115 or datediff([enr_date],  
[fu3_date],"d", "mdy", true) < 90
```

- Same rule in a Longitudinal project

3-month follow-up less than 90 days or more than 115 days after enrollment

```
datediff([baseline_arm_1][enr_date],  
[month_3_arm_1][int_date],"d", "mdy",true)  
> 115 or datediff([baseline_arm_1]  
[enr_date],[month_3_arm_1][int_date],"d",  
"mdy", true) < 90
```

Syntax for longitudinal fields: [event-name][field-name]

More on Data Quality Rules

- Real-time execution

Baseline Interview Height should be between 48 and 84 inches

Enter descriptive name for new rule
(e.g., Participants below age 18)

`[bas_height] < 48 or [bas_height] > 84`

Enter logic for new rule
(e.g., [age] < 18)
[How do I use special functions?](#)

Execute in real time on data entry forms [?](#)

- Exclusions

Rule #1: **Baseline Interview Weight is not between 50 and 300 pounds** ✕

Discrepancies found: **1**

Record	Discrepant fields with their values	Status	Exclude 
1	bas_weight: 48	Issue exists	exclude

Summary

Summary

- REDCap has advanced features that support...
 - Importing data into projects
 - Reports containing ordering and filtering logic
 - Exporting data to a variety of formats
 - Fine-grained security supporting users and roles
 - Data access groups so that site staff see only *their* site's data
 - Data quality rules that allow you to clean your data using complex validation logic

More Information

More Information

- Visit <http://redcap.fredhutch.org>
- Questions? Email us at redcap@fredhutch.org



Thank you!

Paul Litwin - plitwin@fredhutch.org
Collaborative Data Services (CDS)