

BCC: Biostatistics Collaboration Center

Who We Are



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Stat. Analyst



Kate Zumpf, MS
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Business Coordinator

Biostatistics Collaboration Center (BCC)

Mission: to support investigators in the conduct of high-quality, innovative health-related research by providing expertise in biostatistics, statistical programming, and data management.

How do we accomplish this?

1. Every Northwestern investigator is provided a **FREE** initial consultation of 1-2 hours, subsidized by **FSM Office for Research**. Thereafter:
 - a) Grants
 - b) Re-charge (Hourly) Rates
 - c) Subscriptions/partnerships
2. Most grant writing (e.g. developing analysis plans, power/sample size calculations) is also supported by FSM at **no cost to the investigator**, with the goal of establishing successful collaborations.

BCC: Biostatistics Collaboration Center

What We Do

- Many areas of expertise, including:
 - Bayesian Methods
 - Big Data
 - Bioinformatics
 - Causal Inference
 - Clinical Trials
 - Database Design
 - Genomics
 - Longitudinal Data
 - Missing Data
 - Reproducibility
 - Survival Analysis

Many types of software, including:



BCC: Biostatistics Collaboration Center

Shared Statistical Resources



Biostatistics Collaboration Center (BCC)

- Supports **non-cancer** research at NU
- Provides investigators an initial 1-2 hour consultation subsidized by the FSM Office of Research
- Grant, Hourly, Subscription



Quantitative Data Sciences Core (QDSC)

- Supports all **cancer-related** research at NU
- Provides free support to all Cancer Center members subsidized by RHLCCC
- Grant

Biostatistics Research Core (BRC)

- Supports **Lurie Children's Hospital affiliates**
- Provides investigators statistical support subsidized by the **Stanley Manne Research Institute at Lurie Children's**
- Hourly

BCC: Biostatistics Collaboration Center

Shared Resources Contact Info

- Biostatistics Collaboration Center (BCC)
 - Website: <http://www.feinberg.northwestern.edu/sites/bcc/index.html>
 - Email: bcc@northwestern.edu
 - Phone: 312.503.2288
- Quantitative Data Sciences Core (QDSC)
 - Website: http://cancer.northwestern.edu/research/shared_resources/quantitative_data_sciences/index.cfm
 - Email: qdsc_rhlccc@northwestern.edu
 - Phone: 312.503.2288
- Biostatistics Research Core (BRC)
 - Website: <https://www.luriechildrens.org/en-us/research/facilities/Pages/biostatistics.aspx>
 - Email: merreed@luriechildrens.org
 - Phone: 773.755.6328

A Statistician's Guide to REDCap

Elizabeth L. Gray, MS
Senior Statistical Analyst
Department of Preventive Medicine

Note

- Many of the slides to follow come from or were adapted from a similar talk last year by Jody D. Ciolino, PhD as part of this series and from her Clinical Database Management (EB565) course.

What is REDCap?

Research Electronic Data Capture

- Research Electronic Data Capture
- Used for building and managing surveys and study databases efficiently, accurately, securely, and on a fixed budget
 - This includes protected health information (PHI)
- Developed at Vanderbilt University in 2004
- Over 3200 institutions in over 120 countries

Redcap > Excel

Why use  **REDCap** ?
Research Electronic Data Capture

Redcap > ~~Excel~~

Why use REDCap?

Research Electronic Data Capture

- FREE
- **Secure**
- Easy to learn
- Easily accessible, becoming more universal
- **Flexibility that allow for efficient and accurate data collection**

Goals for today

1. Brief introduction and overview of REDCap

- Purpose = ensure high-quality, analyzable data
- Must be able to answer research question via statistical analyses

2. Illustrate advanced features for making the most out of REDCap

- Explain how these features will help save time and effort during and after the study

3. Discuss limitations

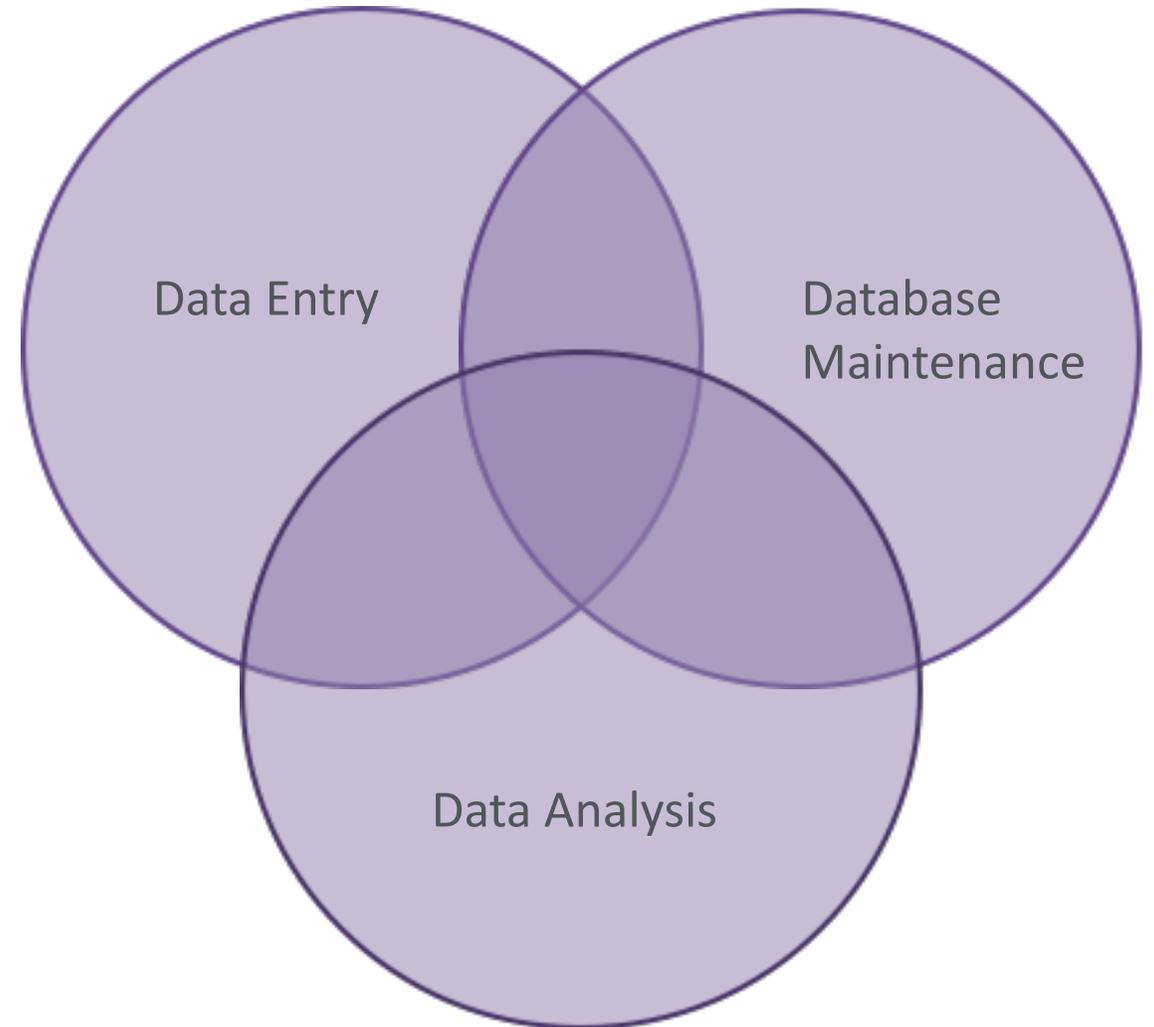
- REDCap = easy to use, but also easy to abuse
- REDCap certainly cannot solve all problems

Something to keep in Mind

Who's involved

- Those that will **enter** the data
- Those that will **build/maintain** the database
- Those that will **analyze** the data

- Depending on study, these three roles may involve:
 - One person, taking on all responsibility
 - Many individuals, with specialized roles in each domain



Getting started

REDCap at Northwestern

- Online session for New Project Owners (email for access)
 - redcap@northwestern.edu
- Log on to REDCap (must be on campus network for VPN)
 - <https://redcap.nubic.northwestern.edu/redcap/>
- REDCap Intro Session & Office Hours
 - <https://nucats.northwestern.edu/>
- All users must complete: REDCap User Agreement
 - <https://redcap.nubic.northwestern.edu/redcap/surveys/?s=WK39RMR44F>

Some Basic Terminology

- Development mode ➡ Production mode
- Development
 - Design the database/data collection tools
 - Customize
 - **Test!!!!**
- Production
 - Live data capture
 - Post-production modifications *must* be made with caution

Getting Started

- Login Page



Log In



Please visit the REDCap Q&A section at the bottom of the landing page upon logging in for further ACCESS ISSUES.

** Project Owners MUST administer permissions for users to their project. REDCap Support does NOT administer access to projects.* All project access begins with the Project Owner.*

Please log in with your user name and password. If you are having trouble logging in, please contact [NU REDCap Support](#).

Username:

Password:

Log In

[Forgot your password?](#)

Getting Started

- My Projects


[Home](#)
[My Projects](#)
[Help & FAQ](#)
[Training Videos](#)
[Send-It](#)
[Messenger](#)

 Logged in as **elg9173**
[My Profile](#)
[Log out](#)

Please visit the REDCap Q&A section at the bottom of the landing page upon logging in for further ACCESS ISSUES.

** Project Owners MUST administer permissions for users to their project. REDCap Support does NOT administer access to projects.* All project access begins with the Project Owner.*

Listed below are the REDCap projects to which you currently have access. Click the project title to open the project. [Read more](#) To review which users still have access to your projects, visit the [User Access Dashboard](#).

Project Title	Records	Fields	Instrument	Type	Status
Unorganized Projects (3)					
QDSC Database	129	84	4 forms 2 surveys		
Expertise/Skills	2	82	1 form 1 survey		
QDSC Project Management	0	83	6 forms		
CBITS (6)					
Telehealth RCT	1,348	1,618	23 forms 8 surveys		
Intellicare Field Trial - Coach Forms	99	64	6 forms		
Telehealth RCT - Coach/Therapist Forms	305	149	11 forms		
Intellicare Field Trial	458	1,224	14 forms 3 surveys		
Intellicare RCT	660	591	11 forms 19 surveys		
Intellicare RCT: Coach Forms	145	59	6 forms		
BCATTS Projects (1)					
BCATTS 2.0	888	91	3 forms 2 surveys		
AbilityLab Studies (4)					
MRSCICS: STU00204305	19	269	8 forms		
HANDS Study	90	668	20 forms		
DoD Study	20	561	18 forms		

Getting Started

- Project Home

HANDS study - practice database

Logged in as **elg9173** | Log out

My Projects
Project Home | Project Setup
REDCap Messenger

Project status: **Development**

Data Collection [Edit instruments](#)

- Record Status Dashboard
- View data collection status of all records
- Add / Edit Records
- Create new records or edit/view existing ones

Applications

- Calendar
- Data Exports, Reports, and Stats
- Data Import Tool
- Data Comparison Tool
- Logging
- Field Comment Log
- File Repository
- User Rights and DAGs
- Randomization
- Data Quality
- API and API Playground

Help & Information

- Help & FAQ
- Video Tutorials
- Suggest a New Feature

[Contact REDCap administrator](#)

Project Home | Project Setup | Other Functionality | Project Revision History

Quick Tasks

- Codebook**
The Codebook is a human-readable, read-only version of the project's Data Dictionary and serves as a quick reference for viewing field attributes.
- Export data**
Export your data from REDCap to open or view in Excel or various stats packages.
- Create a report**
Build custom reports for quick views of your data, and export reports to Excel/CSV.
- Check data quality**
Build or execute data quality rules to find discrepancies and errors in your project data.
- User Rights**
Grant new users access to this project or modify user privileges for current users.
- Online Designer and Data Dictionary Upload**
Create new fields/questions on your data collection instruments or modify existing ones using the Online Designer or by uploading a Data Dictionary. Quick link: [Download the current Data Dictionary](#)
- Data Access Groups**
Create groups of users to limit user access to certain records/responses, in which only users within a given Data Access Group can access records created by users within that group.

Project Dashboard

The tables below provide general dashboard information, such as a list of all users with access to this project, general project statistics, and upcoming calendar events (if any).

Current Users (5)	
User	Expires
cym0910 (Chen Yeh)	never
elg9173 (Elizabeth Gray)	never
lco6487	never

Project Statistics	
Records in project	19
Most recent activity	09/28/2018 2:02pm
Space usage for docs	0.11 MB

Upcoming Calendar Events (next 7 days)		
Time	Date	Description

Getting Started

- Project Setup

REDCap™

Logged in as **elg9173** | Log out

- My Projects
- Project Home or **Project Setup**
- REDCap Messenger

Project status: **Development**

Data Collection [Edit instruments](#)

- Record Status Dashboard
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Help & Information

- Help & FAQ
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- Suggest a New Feature

[Contact REDCap administrator](#)

HANDS study - practice database

[Project Home](#) **[Project Setup](#)** [Other Functionality](#) [Project Revision History](#)

Project status: **Development** Completed steps 1 of 9

Main project settings

Not started

Enable Use surveys in this project? [?](#) [VIDEO: How to create and manage a survey](#)

Disable Use longitudinal data collection with defined events? [?](#)

[I'm done!](#) [Modify project title, purpose, etc.](#)

Design your data collection instruments

Not started

Add or edit fields on your data collection instruments. This may be done by either using the Online Designer (online method) or by uploading a Data Dictionary (offline method). Quick links: [Download PDF of all instruments](#) OR [Download the current Data Dictionary](#).

Go to [Online Designer](#) or [Data Dictionary](#)

You may also browse for pre-built data collection instruments in the [REDCap Shared Library](#)

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

Define your events and designate instruments for them

In progress

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

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

[I'm done!](#)

Enable optional modules and customizations

Optional

Enable Repeatable instruments and events [?](#)

Disable Auto-numbering for records [?](#)

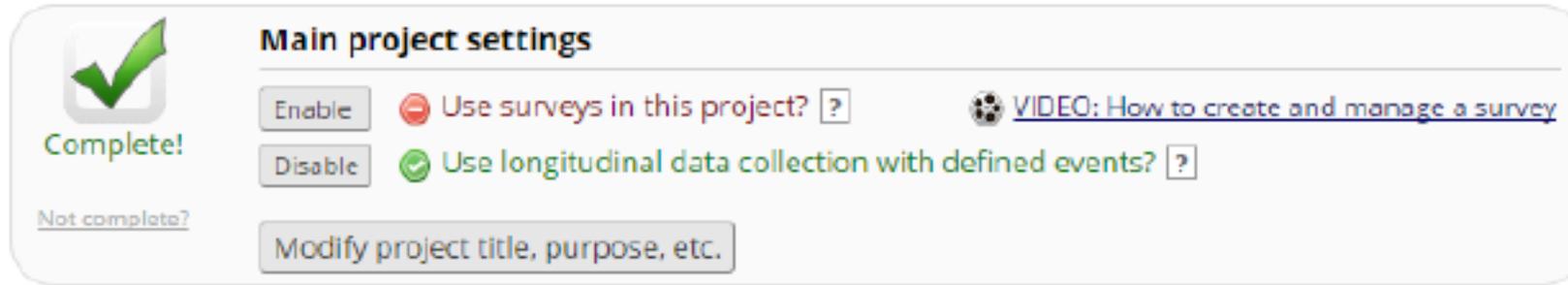
Enable Scheduling module (longitudinal only) [?](#)

Disable Randomization module [?](#)

Enable Designate an email field to use for invitations to survey participants [?](#)

[I'm done!](#) [Additional customizations](#)

Project Setup: Main project settings



Main project settings

Complete! [Not complete?](#)

Enable Use surveys in this project? [?](#) [VIDEO: How to create and manage a survey](#)

Disable Use longitudinal data collection with defined events? [?](#)

[Modify project title, purpose, etc.](#)

- **Use surveys:** REDCap distinguishes between data entry forms (Case Report Forms [CRFs]) and surveys
 - ‘Regular’ CRFs
 - Data entry must occur by a study team member (authorized REDCap user)
 - NOT participant facing
 - Surveys
 - Can be participant facing (do not need to access REDCap database)
 - Can also be completed by a study team member directly in REDCap
- **Use Longitudinal Data:** Fill out the same forms multiple times, most clinical trials

Project Setup: Designing Data Collection Tools

- Designing and refining data collection tools will inevitably take the most time
- Two options in developing data collection tools (case report forms [CRFs])
 - Online designer
 - Data dictionary

Project Setup: Online Designer



Not started

I'm done!

Main project settings

Enable Use surveys in this project? [?](#) [VIDEO: How to create and manage a survey](#)

Disable Use longitudinal data collection with defined events? [?](#)

Modify project title, purpose, etc.



Not started

I'm done!

Design your data collection instruments

Add or edit fields on your data collection instruments. This may be done by either using the Online Designer (online method) or by uploading a Data Dictionary (offline method). Quick links: [Download PDF of all instruments](#) OR [Download the current Data Dictionary](#).

Go to [Online Designer](#) or [Data Dictionary](#)

You may also browse for pre-built data collection Instruments in the [REDCap Shared Library](#)

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



In progress

I'm done!

Define your events and designate instruments for them

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

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

Data Collection Instruments

The Online Designer will allow you to make project modifications to fields and data collection instruments very easily using only your web browser. NOTE: While in development status, all field changes will take effect immediately in real time.

Data Collection Instruments

Add new instrument:

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

Instrument name	Fields	View PDF	Instrument actions
Enrollment Checklist	14		Choose action ▾
Demographics	9		Choose action ▾
Medical History	5		Choose action ▾
Treatment Allocation	1		Choose action ▾
Vitals	4		Choose action ▾
Laboratory Assessment	4		Choose action ▾
IP Tracking	9		Choose action ▾
Termination	6		Choose action ▾
Departures	5		Choose action ▾
Adverse Events	14		Choose action ▾

Web-based Form Builder

Current instrument: **Demographics**

Preview instrument

[Add Field](#) [Add Matrix of Fields](#)

     Variable: dob

Date of Birth  Today M-D-Y

[Add Field](#) [Add Matrix of Fields](#)

     Variable: date_enrolled

Date of enrollment  Today M-D-Y

[Add Field](#) [Add Matrix of Fields](#)

     Variable: age

Age [View equation](#)

[Add Field](#) [Add Matrix of Fields](#)

     Variable: gender

Gender Female
 Male [reset](#)

[Add Field](#) [Add Matrix of Fields](#)

     Variable: race

Race White
 Black or African American
 American Indian or Alaska Native
 Asian
 Native Hawaiian or Other Pacific Islander
 Other [reset](#)

[Add Field](#) [Add Matrix of Fields](#)

Web-based Form Builder

Current instrument: **Demographics**

Preview instrument

Add Field Add Matrix of Fields

Variable: dob

Date of Birth M-D-Y

Add Field Add Matrix of Fields

Variable: date_enrolled

Date of enrollment M-D-Y

Add Field Add Matrix of Fields

Variable: age

Age View equation

Add Field Add Matrix of Fields

Variable: gender

Gender Female Male

Add Field Add Matrix of Fields

Variable: race

Race White Black or African American American Indian or Alaska Native Asian Native Hawaiian or Other Pacific Islander Other

Add Field Add Matrix of Fields

Example Case Report Form

Hypertension Clinical Trial (Demo)

Actions: [Modify instrument](#) [Download PDF of instrument\(s\)](#) [VIDEO: Basic data entry](#)

[Save & Exit Form](#)
[Save & Stay](#)
[-- Cancel --](#)

Demographics

Editing existing Study ID 1

Event Name: **Baseline**

Study ID	1
Date of Birth	<input type="text"/> Today M-D-Y
Date of enrollment	<input type="text"/> Today M-D-Y
Age	<input type="text"/> View equation
Gender	<input type="radio"/> Female <input checked="" type="radio"/> Male
Race	<input type="radio"/> White <input type="radio"/> Black or African American <input type="radio"/> American Indian or Alaska Native <input type="radio"/> Asian <input type="radio"/> Native Hawaiian or Other Pacific Islander <input type="radio"/> Other
Ethnicity	<input type="radio"/> Not Hispanic/Latino <input type="radio"/> Hispanic/Latino

reset

Common Field Types

- Text – single-line text box (text and numbers, with validation options)
- Dropdown – dropdown menu with multiple choice options
- Radio – radio button with multiple choice options
- Calculated – perform real-time calculations (e.g., age)
 - Works on numeric and multiple choice fields, but can only return a numerical value
- *Notes – larger text box*
- *Checkbox – allow selection of > 1 option*
- *File – upload a document*
- *Descriptive – text displayed with no data entry and optional image/file attachment*
- *Slider – visual analog scale (0 – 100)*

Field Types: Examples

Date of Birth	Text Boxes	<input type="text" value="05-10-1965"/> <input type="button" value="Today"/> N-D-Y
Date of enrollment		<input type="text" value="01-01-2017"/> <input type="button" value="Today"/> N-D-Y
Age	Calculated Field	<input type="text" value="51.65"/> View equation
Ethnicity	Radio Button	<input checked="" type="radio"/> Not Hispanic or Latino <input type="radio"/> Hispanic or Latino <input type="radio"/> Not reported
Race	Checkbox (Use Sparingly)	<input type="checkbox"/> Not Available <input type="checkbox"/> White <input type="checkbox"/> Black <input type="checkbox"/> Asian <input type="checkbox"/> Native Hawaiian/Other Pacific Islander <input type="checkbox"/> American Indian/Alaska Native <input type="checkbox"/> Other <input type="checkbox"/> Not reported Check all that apply
Form Status		
Complete?	Dropdown	<input type="text" value="Incomplete"/> ▾

Manual Creation of Radio Button Field

Current instrument: **Demographics**

Preview instrument

Add Field **Add Matrix of Fields**

     Variable: dob

Date of Birth  Today M-D-Y

Add Field **Add Matrix of Fields**

     Variable: date_enrolled

Date of enrollment  Today M-D-Y

Add Field **Add Matrix of Fields**

     Variable: age

Age View equation

Add Field **Add Matrix of Fields**

     Variable: gender

Gender Female
 Male

reset

Add Field **Add Matrix of Fields**

     Variable: race

Race White
 Black or African American
 American Indian or Alaska Native
 Asian

Manual Creation of Radio Button Field

Statistically Speaking....

Field Type: Multiple Choice - Radio Buttons (Single Answer) ▼

Field Label [How to use Piping](#)

Gender

Choices (one choice per line) [Copy existing choices](#)

1, Female
2, Male

[How do I manually code the choices?](#)

Action Tags / Field Annotation (optional)

[Learn about Action Tags](#) or [using Field Annotation](#)

Variable Name (utilized during data export)

gender Enable auto naming of variable based upon its Field Label?

ONLY letters, numbers, and underscores

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

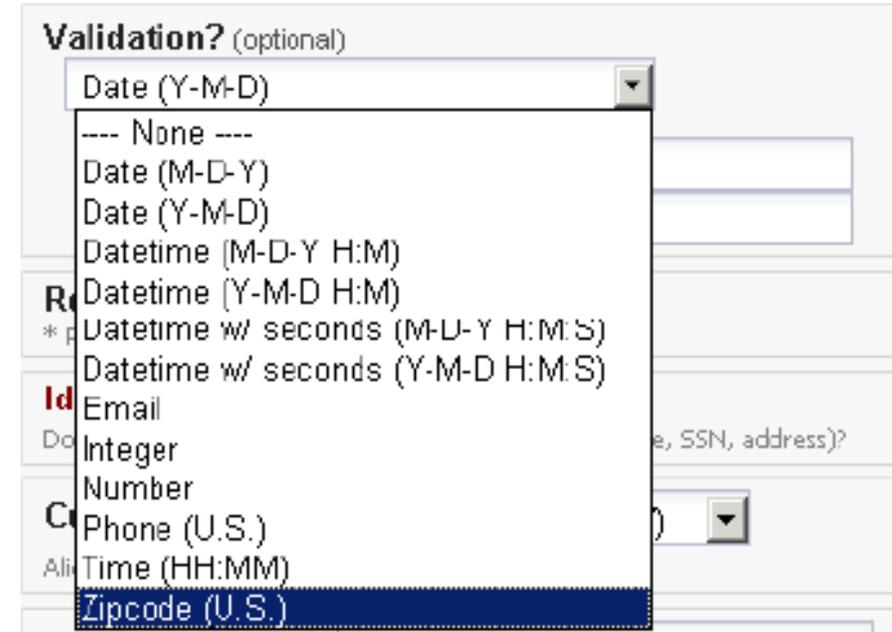
Field Note (optional)
Small reminder text displayed underneath field

Textbox Validation

Statistically Speaking: Preventing Data Entry Errors

- **Hard Validation**

- Error message displayed if entry does not match expected format and entry not saved



Textbox Validation

Statistically Speaking: Preventing Data Entry Errors

- **Soft Validation** - Minimum & Maximum Values
 - Can enter for date, integer, number, and time options
 - Will alert data enterer if entry is outside of range, but will still save entry

A configuration panel for validation rules. It features a dropdown menu labeled "Validation? (optional)" with "Date (M-D-Y)" selected. Below this are two input fields: "Minimum:" and "Maximum:". A separator line with "or" is present. Below the separator is a checkbox labeled "Enable searching within a biomedical ontology" with a question mark icon. At the bottom is a dropdown menu with the text "-- choose ontology to search --".

A screenshot of a form with several input fields. The fields are labeled "Weight in kg", "Height in centimeters", "BMI", and "Form Status". An alert dialog box is overlaid on the form. The dialog box has a title bar "Alert" with a close button (X). The main text of the dialog reads: "The value you provided is outside the suggested range. (10 - 500). This value is admissible, but you may wish to verify." At the bottom right of the dialog is a "Close" button. The background form is dimmed, showing a "reset" button in the top right corner.

Statistically Speaking...

- Validation feature is invaluable in ensuring high-quality data for analyses
- Prevents many headaches later...
- Example:

Excel

	A	B	
1	pat_id	bp	
2	1001	124/76	
3	1002	132/90	
4	1003	140/85	
5	1004	nd	
6	1005	not done	
7			
8			

VS.

REDCap

Edit Field

You may add a new project field to this data collection instrument by completing the fields below and clicking the Save button at the bottom. When you add a new field, it will be added to the form on this page. For an overview of the different field types available, you may view the [Field Types video \(4 min\)](#).

Field Type: Text Box (Short Text, Number, Date/Time, ...)

Field Label: [How to use Piping](#)
Blood Pressure (Systolic):

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

Validation? (optional)
Integer

Minimum: 50
Maximum: 300

Blood Pressure (Systolic):
* must provide value

Blood Pressure (Diastolic):
* must provide value

Required and Identifier Fields

- **Required** – Will alert data enterer if ‘required’ field is left blank, but will allow you to opt to leave blank
- **Identifier** – Tags variables with PHI for removal option during export

Edit Field

You may add a new project field to this data collection instrument by completing the fields below and clicking the Save button at the bottom. When you add a new field, it will be added to the form on this page. For an overview of the different field types available, you may view the [Field Types video \(4 min\)](#).

Field Type: Text Box (Short Text, Number, Date/Time, ...)

Field Label [How to use Piping](#)
Blood Pressure (Systolic):

Action Tags / Field Annotation (optional)
[Learn about Action Tags](#) or [using Field Annotation](#)

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

Validation? (optional) Integer
Minimum: 50
Maximum: 300

– OR –

Enable searching within a biomedical ontology ?
-- choose ontology to search --

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

Matrix of Fields

- Ideal for grouping of questions that share same response options (i.e., Likert scale questions)
- ‘Answer Format’ can be specified as radio buttons or checkboxes
- May use ‘ranking’ to allow only one selection per column across all fields in the matrix (radio buttons only)

The screenshot displays a survey design interface with two field configuration panels. The top panel is for the variable 'Date of Birth' (Variable: dob) and the bottom panel is for 'Date of enrollment' (Variable: date_enrolled). Each panel includes a toolbar with icons for editing, deleting, and adding fields, and a configuration area with a date input field, a 'Today' button, and a format dropdown set to 'M-D-Y'. Above each panel are 'Add Field' and 'Add Matrix of Fields' buttons. The 'Add Matrix of Fields' button in the top panel is circled in red.

Matrix of Fields: Setup

Statistically Speaking....

Matrix Header Text (optional)

Indicate whether the participant has a history of any of the following conditions:

Matrix Rows

Each row represents a different field with its own label and variable name.

Enable auto naming of variable based upon its Field Label?

Field Label	Variable Name <small>ONLY letters, numbers, and underscores</small>	Required?*	Field Annotation ?
Cancer	cancer_hx	<input type="checkbox"/>	<input type="text"/> ✖
Heart disease	heart_hx	<input type="checkbox"/>	<input type="text"/> ✖
Lung disease	lung_hx	<input type="checkbox"/>	<input type="text"/> ✖
Circulatory problems	circ_hx	<input type="checkbox"/>	<input type="text"/> ✖
Mental health disorders	mh_hx	<input type="checkbox"/>	<input type="text"/> ✖

Matrix Column Choices

Choices (one choice per line)

0, No
1, Yes

[How do I manually code the choices?](#)

Other Matrix Info

Answer Format:
Single Answer (Radio Buttons) ▾

Ranking: [What is a ranked matrix of fields?](#)
 Allow only 1 choice to be selected per column (radio buttons only)

Matrix group name: ONLY letters, numbers, and underscores
med_hx [What is a matrix group name?](#)

Matrix of Fields: Example

Indicate whether the participant has a history of any of the following conditions:			
	No	Yes	
Cancer	<input type="radio"/>	<input type="radio"/>	reset
Heart disease	<input type="radio"/>	<input type="radio"/>	reset
Lung disease	<input type="radio"/>	<input type="radio"/>	reset
Circulatory problems	<input type="radio"/>	<input type="radio"/>	reset
Mental health disorders	<input type="radio"/>	<input type="radio"/>	reset

Why use a Binary Matrix of Fields instead of a Checkbox?

- Forced to answer each question, instead of answering "no" by omission
- Specify variable names
 - Checkboxes: automatically generated variable names
 - condition___1, condition___2, condition___3, etc.
 - Matrix of fields
 - condition_cancer, condition_heart_dis, condition_lung_dis, etc.

Branching (aka "skip") Logic

- Information from other fields determines if a particular field will be displayed (e.g., if someone selects 'other' as an option, ask for more information)
 - Statistically speaking... this is yet another invaluable data quality tool that will make data cleaning prior to analyses much easier (something Excel can't do)

The screenshot displays a data entry interface for a variable named 'diagnosis'. The 'Diagnosis' field contains a list of radio button options: Juvenile Dermatomyositis, Juvenile Polymyositis, Systemic sclerosis, Localized Scleroderma (Morphea), Mixed Connective Tissue Disease, Lupus, Overlap Syndrome, and Other. The 'Other' option is circled in red. Below this field are two buttons: 'Add Field' and 'Add Matrix of Fields'. The second field is titled 'Other Diagnosis - Further Description' and is currently empty. Above this field, the text '[Branching logic exists]' is circled in red, indicating that the field's visibility is controlled by the selection in the 'Other' option of the 'Diagnosis' field. The interface also includes a 'reset' button for the first field and an 'Expand' button for the second field.

Branching (aka "skip") Logic

Choose method below for the following field: **enroll** - Enrollment Status:

Advanced Branching Logic Syntax [\(How do I use the advanced syntax?\)](#)

Show the field ONLY if...

— OR —

Drag-N-Drop Logic Builder

Displaying field choices for the following data collection instrument:

Enrollment Checklist ▼

Field choices from other fields
(drag a choice below to box on right)

- studyid = (define criteria)
- hypertensive = Yes (1)
- hypertensive = No (0)
- age_18 = Yes (1)
- age_18 = No (0)
- premeno = Yes (1)
- premeno = No (0)
- negpregnant = Yes (1)
- negpregnant = No (0)



Drag
and
Drop



Show the field ONLY if...

- ALL below are true
- ANY below are true

[Clear logic](#)

Branching (aka "skip") Logic

- Data Entry View:

Section III: Medical History			
Diagnosis	<input type="radio"/> Juvenile Dermatomyositis		
	<input type="radio"/> Juvenile Polymyositis		
	<input type="radio"/> Systemic sclerosis		
	<input type="radio"/> Localized Scleroderma (Morphea)		
	<input type="radio"/> Mixed Connective Tissue Disease		
	<input type="radio"/> Lupus		
	<input type="radio"/> Overlap Syndrome		
	<input type="radio"/> Other		
			reset
2. Date of First Symptom Onset	<input type="text"/>	<input type="text" value="31"/>	Today M-D-Y
	mm/dd/yyyy		
2.1 Date of Onset of JDM Rash (heliotrope, Gottrons, malar rash, shawl sign)	<input type="text"/>	<input type="text" value="31"/>	Today M-D-Y
	mm/dd/yyyy		
2.2 Date of Onset of Muscle Weakness	<input type="text"/>	<input type="text" value="31"/>	Today M-D-Y
	mm/dd/yyyy		

Branching (aka "skip") Logic

- Data Entry View:

Section III: Medical History

Diagnosis

- Juvenile Dermatomyositis
- Juvenile Polymyositis
- Systemic sclerosis
- Localized Scleroderma (Morphea)
- Mixed Connective Tissue Disease
- Lupus
- Overlap Syndrome
- Other

reset

Other Diagnosis - Further Description

Expand

2. Date of First Symptom Onset

mm/dd/yyyy Today M-D-Y

2.1 Date of Onset of JDM Rash (heliotrope, Gottrons, malar rash, shawl sign)

mm/dd/yyyy Today M-D-Y

2.2 Date of Onset of Muscle Weakness

mm/dd/yyyy Today M-D-Y

Project Setup: Data Dictionary



Not started

I'm done!

Main project settings

Enable Use surveys in this project? [?](#)  [VIDEO: How to create and manage a survey](#)

Disable Use longitudinal data collection with defined events? [?](#)

Modify project title, purpose, etc.



Not started

I'm done!

Design your data collection instruments

Add or edit fields on your data collection instruments. This may be done by either using the Online Designer (online method) or by uploading a Data Dictionary (offline method). Quick links: [Download PDF of all instruments](#) OR [Download the current Data Dictionary](#).

Go to or

You may also browse for pre-built data collection instruments in the

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



In progress

I'm done!

Define your events and designate instruments for them

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

Go to or

Offline Form Building via Data Dictionary

1	Variable / Field Name	Form Name	Section Header	Field Type	Field Label
2	record_id	phone_prescreening		text	Subject ID
3	d_prescreen	phone_prescreening		text	Date Pre-screening Phone Call
4	first_name	phone_prescreening		text	First Name
5	last_name	phone_prescreening		text	Last Name
6	d_dob	phone_prescreening		text	Date Of Birth
7	email	phone_prescreening	<center>Contact Information</center>	text	Email
8	telephone	phone_prescreening		text	Telephone
9	address	phone_prescreening		text	Address
10	city	phone_prescreening		text	City
11	state	phone_prescreening		dropdown	State
12	zip_code	phone_prescreening		text	Zip Code
13	age	phone_prescreening	<center>Demographics</center>	calc	Age at Screening
14	age_descript	phone_prescreening		descriptive	<center>DO NOT PROCEED -
15	gender	phone_prescreening		radio	Gender
16	race	phone_prescreening		radio	Race
17	race_other	phone_prescreening		text	Race - Other
18	ethnicity	phone_prescreening		radio	Ethnicity
19	prescreen_pass	phone_prescreening	<center>Pre-screening Outcome</center>	yesno	Did the patient satisfy all pre-screening eligibility criteria?
20	prescreen_future	phone_prescreening		yesno	Could the patient be eligible in the future?
21	prescreen_fail_now	phone_prescreening		checkbox	Why did the patient fail the pre-screen for now?
22	prescreen_fail_perm	phone_prescreening		checkbox	Why did the patient fail the pre-screen?
23	prescreen_fail_other	phone_prescreening		text	If other, BRIEFLY describe:
24	d_screened	general_screening		text	Date Screening Visit
25	consent_signed	general_screening		yesno	Informed consent signed?

'Arms' and Events

[Project Home](#) [Project Setup](#) [Other Functionality](#) [Project Revision History](#)

Project status: Development Completed steps **5** of **9**

Complete!
[Not complete?](#)

Main project settings

Use surveys in this project? [?](#) [VIDEO: How to create and manage a survey](#)

Use longitudinal data collection with defined events? [?](#)

Complete!
[Not complete?](#)

Design your data collection instruments

Add or edit fields on your data collection instruments. This may be done by either using the Online Designer (online method) or by uploading a Data Dictionary (offline method). Quick links: [Download PDF of all instruments](#) OR [Download the current Data Dictionary](#)

Go to or

You may also browse for pre-built data collection instruments in the

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

Complete!
[Not complete?](#)

Define your events and designate instruments for them

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

Go to or

'Arms' and Events

- **Events** = groupings of (repeated) forms at specific study time points
- **Arms** = groupings of events (schedule for participants may vary according to study arm or study progress)

'Arms' and Events

Arm 1: Prenatal

Arm 2: Postpartum

Arm 3: Rx Drug Change Log

Arm 4: Baby Pilot

+Add New Arm

Arm name: **Prenatal**

[Rename Arm 1](#)

	Event #	Days Offset	Offset Range Min / Max	Event Name	Unique event name (auto-generated)
	1	0	-0/+0	Consent	consent_arm_1
	2	0	-0/+0	V1 Baseline	v1_baseline_arm_1
	3	28	-14/+14	V2 Prenatal	v2_prenatal_arm_1
	4	56	-14/+14	V3 Prenatal	v3_prenatal_arm_1
	5	84	-14/+14	V4 Prenatal	v4_prenatal_arm_1
	6	112	-14/+14	V5 Prenatal	v5_prenatal_arm_1
	7	140	-14/+14	V6 Prenatal	v6_prenatal_arm_1
	8	168	-14/+14	V7 Prenatal	v7_prenatal_arm_1
	9	196	-14/+14	V8 Prenatal	v8_prenatal_arm_1
	10	224	-14/+14	V9 Prenatal	v9_prenatal_arm_1
	11	252	-14/+14	V10 Prenatal	v10_prenatal_arm_1
	12	280	-14/+14	V11 Prenatal	v11_prenatal_arm_1
<input type="button" value="Add new event"/>	<input type="text" value=""/> Days	<input type="text" value="-0"/> <input type="text" value="+0"/>	<input type="text"/>	<input type="text"/>	
	Convert from other units			Descriptive name for this event	

Designate Instruments for Events

Arm name: **Prenatal**

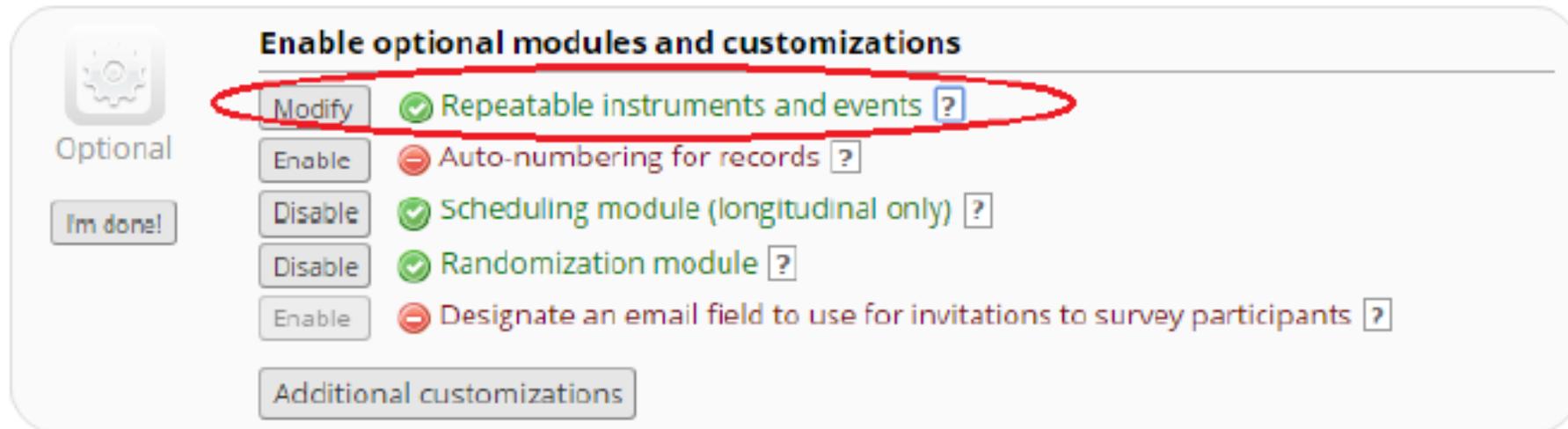
Begin Editing

Save

Data Collection Instrument	Consent (1)	V1 Baseline (2)	V2 Prenatal (3)	V3 Prenatal (4)	V4 Prenatal (5)	V5 Prenatal (6)	V6 Prenatal (7)	V7 Prenatal (8)	V8 Prenatal (9)	V9 Prenatal (10)	V10 Prenatal (11)	V11 Prenatal (12)
Screen Consent Eligibility	✓											
Consent Change		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Participant Status	✓											
Visit Compliance		✓										
SSRI Dose Trajectory	✓											
Concomitant Medications	✓											
Diagnosis Trajectory	✓											
Concentration		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Blood Draw		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Vitals		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Visit Medical Information		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Alcohol Cigarette And Other Drug Use		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Abbreviated Asberg Side Effect (ASE)		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Rx Drug Change Intake												

Repeatable Instruments and Events

- Ability to repeat a single instrument (e.g., Adverse Events) or an entire event of instruments (e.g., Clinic visits) an unlimited number of times without having to specify the amount needed
- Able to implement with surveys



The screenshot shows a settings panel titled "Enable optional modules and customizations". On the left, there is a gear icon labeled "Optional" and a button that says "I'm done!". The main area contains a list of modules with their status and control buttons:

Control	Status	Module Name
Modify	Enabled (Green checkmark)	Repeatable instruments and events ?
Enable	Disabled (Red minus)	Auto-numbering for records ?
Disable	Enabled (Green checkmark)	Scheduling module (longitudinal only) ?
Disable	Enabled (Green checkmark)	Randomization module ?
Enable	Disabled (Red minus)	Designate an email field to use for invitations to survey participants ?

At the bottom of the panel is a button labeled "Additional customizations".

Repeatable Instruments and Events

 Data Collection Instrument	FU visit 1 week 1 fu_v1_w1	FU visit 2 week 2 fu_v2_w2	FU visit 3 week 4 fu_v3_w4	FU visit 4 week 8 fu_v4_w8	FU visit 5 week 12 fu_v5_w12	Protocol Deviation (+1)	+ Add new (+2)	Study Completion / Termination
Phone Pre-screening								
General Screening								
Hypoxia Screening								
Eligibility Criteria								
Medical Monitor Approval								
Randomize								
Adverse Event	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>			
Clinical Measurements	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>			
Beck Depression Inventory	<input checked="" type="checkbox"/>				<input type="checkbox"/>			
Questionnaires	<input checked="" type="checkbox"/>				<input type="checkbox"/>			
California Verbal Learning Test	<input checked="" type="checkbox"/>				<input type="checkbox"/>			
D-KEFS Color Word Interference Test	<input checked="" type="checkbox"/>				<input type="checkbox"/>			
Protocol Deviation						<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Study Termination								<input type="checkbox"/>
Delete all data on event:	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	

More about surveys

Data Collection Instruments

Survey options: [Survey Queue](#) [Survey Login](#) [Survey Notifications](#)

Instrument name	Fields	View PDF	Enabled as survey	Instrument actions	Survey-related options
Registry Form	17			Choose action ▾	Survey settings + Automated Invitations
Visit Start Form	6			Choose action ▾	Survey settings + Automated Invitations
Intake Form	230		Enable	Choose action ▾	
Visit Form	130		Enable	Choose action ▾	
CHAQ Child	62		Enable	Choose action ▾	
CHAQ Parent	62		Enable	Choose action ▾	
PEDSQL Child	47		Enable	Choose action ▾	
PEDSQL Parent	47		Enable	Choose action ▾	
Methotrexate Forms	42		Enable	Choose action ▾	

More about surveys

Survey Design Options: [Copy design to other surveys](#)

Logo
(Optional: display an image above the survey title)

Add new logo:
 No file chosen
(Images wider than 600 pixels will be downsized to fit page.)
 If using a logo, hide survey title on survey page?

Use enhanced radio buttons and checkboxes?
(Includes Yes/No and True/False fields)

Standard radios and checkboxes

Size of survey text

Large

Font of survey text

Open Sans

Survey theme

Default

Survey design preview (sample survey): [Expand](#)

This is the survey title

Your survey instructions will go here. The instructions can tell your survey participant about the purpose as well as what to expect once they have completed the survey. Below is a listing of various question types to be displayed on your survey.

This is a section header to divide the survey page into sections.

More about surveys

Survey Customizations:

Question Numbering
Custom numbered ▼
Question numbers will not display correctly if using auto numbering if some questions have branching logic employed. Question auto numbering has been automatically disabled because some of your survey questions use branching logic.

Question Display Format
(One page or multiple pages?)
All on one page ▼
 Display page numbers at top of survey page
 Hide the 'Previous Page' button (i.e., Back button) on the survey page (prevents respondents from going back to previous pages)

Allow participants to download a PDF of their responses at end of survey?
Display a button for the participant to download a PDF file of their responses for the survey they just completed.
No ▼
This option will not be available if the Survey Auto-continue or Survey Queue auto-start option is enabled. Also, if a field utilizes the @HIDDEN action tag, it will not be displayed in the PDF.

For 'Required' fields, display the red 'must provide value' text on the survey page?
Yes ▼
If 'No', then it will NOT display the following text beneath all 'Required' fields: * must provide value.

Allow survey respondents to view aggregate survey results after completing the survey?
After completing the survey, participants can view ALL responses in aggregate graphical format and/or as descriptive statistics. Also, the individual respondent's answer will be highlighted in the results.
Disabled ▼

Additional settings:
10 Minimum number of responses required before participants are allowed to view aggregate data (recommended = 10).
 Do not show plots for questions lacking diversity in response values (what does this mean?)

Text-To-Speech functionality
(Allows text on survey page to be read audibly to participants.)
Disabled ▼
NOTICE: All text that is spoken is sent to a service hosted at Vanderbilt University that utilizes the IBM Watson Text-to-Speech API service. Be advised that if the survey utilizes piping, for privacy concerns, data piped from Identifier fields will *not* be sent to the service with the rest of the text but will instead be redacted.

More about surveys

Survey Access:

🛑 Response Limit (optional)
(Maximum number of responses to collect. Prevents respondents from starting the survey after a set number of responses have been collected.) [?] (e.g., 150) If left blank, the response limit will not be enforced.
Will include

🕒 Custom text to display to respondent on survey when limit is reached:

🕒 Time Limit for Survey Completion (optional)
(The amount of time that each respondent has to complete the survey based on when they were initially sent the survey invitation. Note: This feature excludes public survey links.) days hours minutes
If the respondent loads the survey after this time has passed, it will not allow them to begin or continue the survey. (If all are left blank, the time limit will not be enforced.)

📅 Survey Expiration (optional)
(Time after which the survey will become inactive.) [?] N/D/Y:H:M
The time must be for the time zone **US/Central**, in which the current time is 01/23/2019 16:02.

🔄 Allow 'Save & Return Later' option for respondents?
(Allow respondents to leave the survey and return later.) [?]

Allow respondents to return without needing a return code [?]
 Allow respondents to return and modify completed responses [?]

More about surveys

Survey Termination Options:

(Optional) Auto-continue to next survey: Automatically start the next survey instrument after finishing this survey 

— OTHERWISE —

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

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

[How to use Piping here](#)

— OR —

Survey Completion Text
(Displayed after survey is completed as "thank you" text or as acknowledgement text)

Thank you! Hand to the patient.



[How to use Piping here](#)

Send confirmation email (optional)?

(Email the respondent when they complete the survey)

Save Changes

More about surveys

Data Collection Instruments

Survey options:

- Survey Queue
- Survey Login
- Survey Notifications

Instrument name	Fields	View PDF	Enabled as survey	Instrument actions	Survey-related options
Registry Form	17			Choose action ▾	<ul style="list-style-type: none"> Survey settings + Automated Invitations
Visit Start Form	6			Choose action ▾	<ul style="list-style-type: none"> Survey settings + Automated Invitations
Intake Form	230		Enable	Choose action ▾	
Visit Form	130		Enable	Choose action ▾	
CHAQ Child	62		Enable	Choose action ▾	
CHAQ Parent	62		Enable	Choose action ▾	
PEDSQL Child	47		Enable	Choose action ▾	
PEDSQL Parent	47		Enable	Choose action ▾	
Methotrexate Forms	42		Enable	Choose action ▾	

More about surveys

Define Conditions for Automated Survey Invitations

Instructions: In this pop-up you may define your conditions for automated survey invitations that will be sent out for the survey (and event, if a longitudinal project) listed in the info box below. [Tell me more](#)

Info

Survey title: Registry Form

Event: Intake (Arm 1: Child < 8)

STEP 1: Compose message

From: elizabeth.gray@northwestern.edu
(select any project user to be the "Sender")

To: [All participants who meet the conditions defined]

Subject: _____

NOTE: The survey link will be automatically included in the email message.

You may use HTML formatting in the email message: bold, <u> underline, <i> italics, link, etc.

[How to use Piping in the survey invitation](#)

STEP 2: Conditions

Specify conditions for sending invitations:

When the following survey is completed:
-- select a survey --

AND ▼

When the following logic becomes true:

(e.g., [enrollment_arm_1][age] > 30 and [enrollment_arm_1][gender] = "1")
[How do I use special functions?](#)

Test logic with a record: -- select record --

Ensure logic is still true before sending invitation? [?](#)

STEP 3: When to send invitations AFTER conditions are met

Send immediately

Send on next: -- select day -- at time: _____

Send after lapse of time: _____ days _____ hours _____ minutes

Send at exact date/time: _____

OPTIONAL: Enable reminders

Re-send invitation as a reminder if participant has not responded by a specified time?

STEP 4: Activated?

Activate these automated invitations? In order for automated survey invitations to be sent using these specified conditions, it must be set to Active. You may make them Not Active (and vice versa) at any point in the future.

Active Not Active

More about surveys

REDCap

Logged in as elg9173 | Log out

My Projects

Project Home or Project Setup

REDCap Messenger

Project status: **Production**

Data Collection

- Manage Survey Participants**
- Record Status Dashboard
- Add / Edit Records

Applications

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

Reports [Edit reports](#)

1) Registered Patients

Help & Information

- Help & FAQ
- Video Tutorials
- Suggest a New Feature

Contact REDCap administrator

Patient-Reported Outcomes in JM (CAT-ADMIN PROMIS)

Manage Survey Participants

Public Survey Link Participant List Survey Invitation Log

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

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

The survey link below applies only to **"Registry Form" - Intake (Arm 1: Child < 8)**

Public Survey URL:

Link Actions

- Open public survey
- Open public survey + Log out
- Send me URL via email
- Survey Access Code or QR Code

Link Customizations

- Get Short Survey Link
- Create Custom Survey Link
- Get Embed Code

User Rights and Permissions

- Grant role-specific access privileges to study team personnel
- User rights include:
 - Project design and setup
 - Data entry
 - Data import and export
 - Form-specific access
 - Other custom/specific rights (e.g., randomization, logging, data import, etc.)
- **Data Access Groups:** when there are multiple sites in your study

User Rights and Permissions

Role name
(click role name to edit role)

Coordinator

Custom

Data Entry Person

Database Management

Project Owner

READ Only

Statistician

Editing existing user role "Statistician"

Basic Rights

Role name: Statistician

Highest level privileges:

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

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

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

Other privileges:

- Manage Survey Participants
- Calendar
- Data Import Tool
- Data Comparison Tool
- Logging
- File Repository
- Data Quality Create & edit rules Execute rules
- Data Resolution Workflow No Access

Data Entry Rights

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

	No Access	Read Only	View & Edit	Edit survey responses
Screen Consent Eligibility	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	
Consent Change	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	
Participant Status	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	
Visit Compliance	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	
SSRI Dose Trajectory	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	
Concomitant Medications	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	
Diagnosis Trajectory	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	
Concentration	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	
Blood Draw	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	
Vitals	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	
Visit Medical Information	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	
Alcohol Cigarette And Other Drug Use	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	
Abbreviated Asberg Side Effect (ASE)	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	
Rx Drug Change Intake	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	
Edinburgh Postnatal Depression Scale (EPDS) (survey)	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="checkbox"/>
Generalized Anxiety Disorder (GAD-7)	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="checkbox"/>

Fun things: Reverse branching logic

- If you need to preserve consistency, can use branching or "skip" logic to give warnings

Level of Injury
* must provide value

C2
 C3
 C4
 C5
 C6
 C7
 C8
 T1

Check against medical record. reset

Inclusion Criteria	
Informed consent signed?	<input checked="" type="radio"/> Yes <input type="radio"/> No reset
History of a non-progressive spinal cord injury inclusive of the levels of C2 and T1?	<input type="radio"/> Yes <input checked="" type="radio"/> No reset
General Screening lists an injury level!	

[injury_level]<>' and [inclus_sci_level]='0' and [inclus_sci_level]<>'

Fun things: Reverse "skip" logic

- For randomization, or when dealing with calculated fields, may want to turn a numerical entry into a categorical one

Training Hand Strength (MMT) score
* must provide value

45

Category - Training Hand Strength (MMT) score
* must provide value

<30
 ≥30

Reference field above. [reset](#)

DO NOT PROCEED - Training Hand Strength (MMT) score does not match Category

$(([\text{grassp_screening_mmt}] < 30 \text{ and } [\text{cat_grassp_screen}] = 2) \text{ or } ([\text{grassp_screening_mmt}] \geq 30 \text{ and } [\text{cat_grassp_screen}] = 1))$

Fun things: Action Tags/Field Annotation

- In general, these exist for documentation purposes, but many other applications
 - Word limits: @CHARLIMIT=50; @WORDLIMIT=50
 - Defaults: @DEFAULT="1"; @USERNAME; @PLACEHOLDER="For example, cats"
 - Redundant fields: @HIDDEN

The screenshot shows a configuration panel for a form field. The field type is set to "Multiple Choice - Radio Buttons (Single Answer)". The field label is "Gender". The choices are "1, Female" and "2, Male". The "Action Tags / Field Annotation" section is highlighted with a red circle and contains a text input field and a link to learn more about action tags and field annotations.

Field Type: Multiple Choice - Radio Buttons (Single Answer) ▼

Field Label [How to use Piping](#)

Gender

Choices (one choice per line) [Copy existing choices](#)

1, Female
2, Male

[How do I manually code the choices?](#)

Action Tags / Field Annotation (optional)

[Learn about Action Tags](#) or [using Field Annotation](#)

Variable Name (utilized during data export)

gender Enable auto naming of variable based upon its Field Label?

ONLY letters, numbers, and underscores

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

Fun things: HTML

- Center of page: `<center>Text</center>`; Tab: `<p class="indent"></p>`
- **Bold**: `Text`; *Italics*: `<i>Text</i>`; Underline: `<u>Text</u>`
- **Font size/color**: `Text`
- **Emoji**: Unicode: U+1F603, Redcap code: `😃`

Pain Intensity
In the past 7 days...

How bad was your pain on average?

* must provide value

0 😊 - No pain

1

2

3

4

5 😐

6

7

8

9

10 😞 - Worst pain you can think of

Fun things: Piping

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

IMPORTANT note: Branching logic/piping with arms/events

- If you are using longitudinal settings with multiple arms/events, branching logic and piping need to reflect that
 - When field that has branching logic applied to it is in a different event from the fields used for the logic
- Example: Pipe in "training hand" decided during screening, into intervention visits

Current instrument: **Intervention**

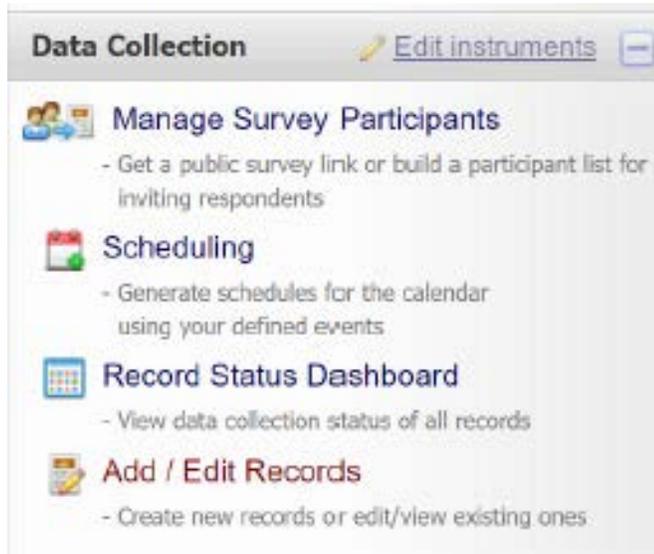
Preview instrument

The screenshot shows a software interface for defining a field. At the top, it says "Current instrument: **Intervention**" and "Preview instrument". Below this is a toolbar with "Add Field" and "Add Matrix of Fields" buttons. The main area displays a field definition: "Variable: training_hand_pipe [Branching logic exists]". Below the variable name is the field definition: "Training Hand: [screening_arm_1][training_hand]". At the bottom, there are again "Add Field" and "Add Matrix of Fields" buttons.

Post Database Development

Data Entry, Quality Control, and Reporting

Data Entry



Data Collection [Edit instruments](#)

- Manage Survey Participants**
 - Get a public survey link or build a participant list for inviting respondents
- Scheduling**
 - Generate schedules for the calendar using your defined events
- Record Status Dashboard**
 - View data collection status of all records
- Add / Edit Records**
 - Create new records or edit/view existing ones

Add / Edit Records

You may view an existing record/response by selecting it from the drop-down lists below. To create a new record/response, type a new box below and hit Tab or Enter. To quickly find a record without using the drop-downs, the text box will auto-populate with existing records you begin to type in it, allowing you to select it.

Total records: 8		
Choose an existing Study ID	Arm 1: Arm1 ▼	-- select record -- ▼
Enter a new or existing Study ID	Arm 1: Arm1 ▼	9999

Data Search	
Choose a field to search (excludes multiple choice fields)	-- select search field -- ▼
Search query Begin typing to search the project data, then click an item in the list to navigate to that record.	

Data Entry

Record Home Page

 **Record "9999" is a new Study ID.** To create the record and begin entering data for it, click any gray status icon below.

The grid below displays the form-by-form progress of data entered for the currently selected record. You may click on the colored status icons to access that form/event. If you wish, you may modify the events below by navigating to the [Define My Events](#) page.

Legend for status icons:

-  Incomplete  Incomplete (no data saved) 
-  Unverified    Many statuses (all same)
-  Complete  Many statuses (mixed)

NEW Study ID 9999

 Data Collection Instrument	Baseline	Week2	Week4	Week6	Week8	Week10	Week12	Ad Hoc
Enrollment Checklist								
Demographics								
Medical History								
Treatment Allocation								
Vitals								
Laboratory Assessment								
IP Tracking								
Termination								
Departures								
Adverse Events								

Data Entry: Status Icons

Enrollment Status: Eligible, pending enrollment
 Eligible, refused consent
 Eligible, pending enrollment reset

Form Status

Complete? Incomplete ▼

Legend for status icons:

- Incomplete Incomplete (no data saved) ?
- Unverified Many statuses (all same)
- Complete Many statuses (mixed)

Data Entry: Status Icons

Data Collection Instrument	Consent	V1 Baseline	V2 Prenatal	V3 Prenatal	V4 Prenatal	V5 Prenatal	V6 Prenatal	V7 Prenatal	V8 Prenatal	V9 Prenatal	V10 Prenatal	V11 Prenatal
Screen Consent Eligibility	●											
Consent Change		●	●	●	●	●	○	○	○	○	○	○
Participant Status	○											
Visit Compliance		○										
SSRI Dose Trajectory	○											
Concomitant Medications	○											
Diagnosis Trajectory	○											
Concentration		○	○	○	○	○	○	○	○	○	○	○
Blood Draw		●	●	●	●	●	○	○	○	○	○	○
Vitals		●	●	●	●	●	○	○	○	○	○	○
Visit Medical Information		●	●	●	●	●	○	○	○	○	○	○
Alcohol Cigarette And Other Drug Use		●	●	●	●	●	○	○	○	○	○	○
Abbreviated Asberg Side Effect (ASE)		●	●	●	●	●	○	○	○	○	○	○
Edinburgh Postnatal Depression Scale (EPDS) (survey)		✓	✓	✓	✓	✓	○	○	○	○	○	○
Generalized Anxiety Disorder (GAD-7) (survey)		✓	✓	✓	✓	✓	○	○	○	○	○	○
Quick Inventory Depressive Symptomatology (QIDS) (survey)		✓	✓	✓	✓	✓	○	○	○	○	○	○
Global Health (survey)		✓	✓	✓	✓	✓	○	○	○	○	○	○
Demographics (survey)		✓										
Adverse Childhood Experience (ACE) (survey)		✓										
Chronic Medical Conditions (CMC) (survey)		✓										
Mood Disorder Questionnaire (MDQ) (survey)		✓										
Mini International Neuropsychiatric Interview (MINI)		●										
Antidepressant Treatment History Form (ATHF)		●										

Data History & Field Comment Log

Marijuana

Currently use marijuana?
 Yes
 No

[reset](#)

Data History for variable "marijuana_ever" for record "1"

Listed below is the history of all data entered for the variable "marijuana_ever" for Subject ID "1". The data history results are sorted from earliest to most recent.

Date/Time of Change	User	Data Changes Made
04/24/2018 10:38am	otr8212	Yes (1)
01/28/2019 3:45pm	elg9173	No (0)

[Close](#)

Field Comment Log

This pop-up displays all the field comments for the record and field specified below. Users with access to data entry forms may leave one or more comments on any field on a data collection instrument, after which the balloon icon will stay lit up to signify that comments exist for that field for this record. All field comments for all records/fields can also be viewed, keyword searched, and filtered on the [Field Comment Log](#) page in this project. NOTE: If you wish to prevent all users in this project from editing or deleting field comments below, see the Additional Customizations popup on the Project Setup page.

Subject ID: **1**
 Event: **Screening**
 Field: **marijuana_ever** ("Currently use marijuana?")

	Date/Time	User	Comments
	01/28/2019 3:44pm	elg9173	Infrequent use
	01/28/2019 3:46pm	elg9173	<input style="width: 100%;" type="text"/>

[Comment](#) [Cancel](#)

Reports, Graphs, and Descriptive Stats

- Reporting feature may be useful for quick summarizations and tracking/coordination

The screenshot shows a sidebar menu with two main sections: 'Applications' and 'Reports'. The 'Applications' section includes: Calendar, Data Exports, Reports, and Stats, Data Import Tool, Data Comparison Tool, Logging, Field Comment Log, File Repository, User Rights and DAGs, Randomization, Data Quality, and API and API Playground. The 'Reports' section includes: 1) NBack uploaded files, 2) Pre-screened, 3) Screened, 4) Randomized, 5) Hypoxia screening, 6) Protocol Deviations, 7) Adverse Events, and 8) Beck's Depression > 15 & Suicidality.

Number of results returned: 42
Total number of records queried: 561
(*records* = total available data across all designated events)

Stats & Charts | Export Report | Print Page | Edit Report

Live filters: [Data Access Group]

Screened

Subject ID record_id	Event Name redcap_event_name	Date Screening Visit d_screened
969-1	Screening	06-27-2018
969-2	Screening	08-01-2018
969-3	Screening	08-02-2018
969-4	Screening	09-20-2018
969-6	Screening	08-03-2018
969-7	Screening	08-09-2018
969-8	Screening	09-13-2018
969-9	Screening	08-30-2018

Reports, Graphs, and Descriptive Stats

- REDCap can also generate simple descriptive statistics and summaries
- You can select an individual data point to navigate to that record

Ncenters

DISPLAY OPTIONS

Optional: Select a record to overlay onto the plots below -- select record -- ▾

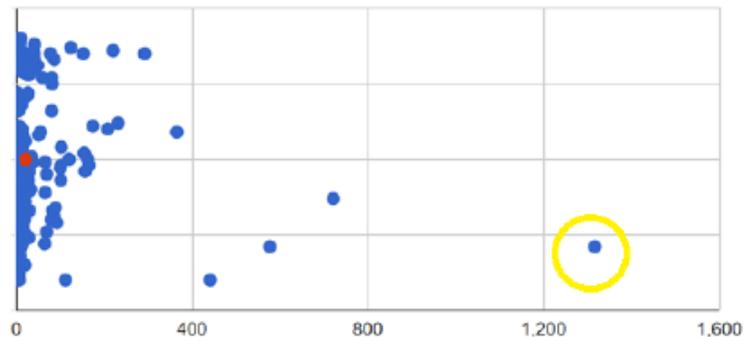
Viewing options:

How many centers? [Refresh Plot](#)

Total Count (N)	Missing	Unique	Min	Max	Mean	StDev	Sum	Percentile						
								0.05	0.10	0.25	0.50 Median	0.75	0.90	0.95
133	18 (11.9%)	69	2.00	1,315.00	65.48	148.92	8,709.00	2.00	3.00	7.00	20.00	68.00	152.60	223.40

Lowest values: 2, 2, 2, 2, 2

Highest values: 364, 440, 576, 720, 1315



[Download image](#)

Report Filtering

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 Name	Instrument	Action
Field 1	record_id "Subject ID"	Instrument: Phone Pre-screening	<input type="checkbox"/>
Field 2	d_screened "Date Screening Visit"	Instrument: General Screening	<input type="checkbox"/>
Field 3	screen_hy_pass "Elbow strength incre:"	Instrument: Hypoxia Screening	<input type="checkbox"/>
Field 4	hypoxia_screening_complete "Comple	Instrument: Hypoxia Screening	<input type="checkbox"/>
Field 5	eligibility_criteria_complete "Complete	Instrument: Eligibility Criteria	<input type="checkbox"/>
Field 6	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)?

STEP 3

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

Filters (optional) **Operator / Value**

Filter	Field Name	Operator	Value	Action
Filter 1	prescreen_pass "Did the patient satisf" in All events	=	Yes	<input type="checkbox"/>
AND				
Filter 2	Type variable name or field label in All events	=		

Switch format: [Use advanced logic](#)

Data Export

Exporting "All data (all records and fields)"

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

Choose export format

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

De-identification options (optional)

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

Known Identifiers:

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

Free-form text:

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

Date and datetime fields:

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

[Deselect all options](#)

Export Data Cancel

Data Export

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	record_id	redcap_event	redcap_data	d_prescreen	first_name	last_name	d_dob	age	gender	race	race_other	ethnicity	prescreen_pass
2	1	pre_screening	kessler	7/24/2016	Alfreda	A	3/6/1994	22	2	88	Cuban	1	1
3	1	screening_arm	kessler										
4	1	randomization	kessler										
5	1	baseline_visit	kessler										
6	1	treatment_day	kessler										
7	1	treatment_day	kessler										
8	1	followup_visit	kessler										
9	1	followup_visit	kessler										
10	2	pre_screening	miami	8/21/2017	Bobby	B	8/20/1992	25	1	2		2	1
11	2	screening_arm	miami										
12	2	randomization	miami										
13	2	baseline_visit	miami										
14	2	treatment_day	miami										
15	2	treatment_day	miami										
16	2	followup_visit	miami										
17	2	followup_visit	miami										
18	3	pre_screening	sralab	4/24/2018	Carrie	C	4/21/1988	30	2	5		1	1
19	3	screening_arm	sralab										
20	3	randomization	sralab										
21	3	baseline_visit	sralab										
22	3	treatment_day	sralab										
23	3	treatment_day	sralab										
24	3	treatment_day	sralab										

Advanced REDCap Features

Randomization and API

Randomization in REDCap

- Allows for custom pre-generated (i.e., not adaptive) randomization list
- Must be tied to a single event in a single 'Arm'
- Differing rights:
 - Setup (programmer/analyst/statistician)
 - Dashboard (unblinded personnel)
 - Randomize (unblinded personnel performing randomization)



In progress

[I'm done!](#)

Set up a randomization model

The randomization module will help you implement a defined randomization model within your project, allowing you to randomize your subjects (i.e. records in your project).

Go to [Set up randomization](#)

Randomization in REDCap

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 (multiple choice 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 multiple choice fields)

cat_grassp_screen (Category - Training Hand Strength (MMT) sc ▼ for Screening ▼

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 (3 groups currently exist)

Use an existing field to designate each group/site

- select a field - ▼ for ▼

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.

randomize (Randomization Assignment) ▼ for Randomization ▼

Save randomization model

Erase randomization model

Randomization in REDCap

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

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

	A	B	C
1	randomize	cat_grassp_screen	redcap_data_access_group
2	1	1	971
3	5	1	971
4	4	1	971
5	3	1	971
6	2	1	971
7	5	1	971
8	3	1	971
9	1	1	971
10	4	1	971
11	2	1	971
12	4	1	971
13	2	1	971
14	5	1	971
15	5	1	971
16	4	1	971

REDCap API

- API = Application Programming Interface
- Allows external applications (e.g., SAS, R) to connect to REDCap and retrieve and/or modify data
- Useful for performing automated data exports and transferring data between REDCap projects (though preferable to have one project per study)
- To use the REDCap API, users must be granted 'tokens' by a REDCap administrator that is specific to each username and project
- Each user running any code using the API must request their own API token, which should be treated like a password

REDCap API Code in R

- Connect to REDCap

```
library(redcapAPI)
tdate <- Sys.Date()
rdata_token <- "TOKEN"
rdata_url <- "https://redcap.nubic.northwestern.edu/redcap/api/"
rdata_con <- redcapConnection(url = rdata_url, token = rdata_token)
```

- Export

```
data <- exportRecords(rdata_con, content = "record")
write.csv(data, file = paste("Data_", tdate, ".csv", sep = ""), row.names = FALSE)
redcap_data <- read.csv(paste("Redcap_", tdate, ".csv", sep = ""))
```

- Import

```
new_data <- .....
importRecords(rdata_con, new_data, overwriteBehavior="overwrite")
```

Limitations and Resources

Cautions

- Less is more
 - Just because technology and features are available, does not mean you need to or should use it: “Don’t use a hammer to swat a fly”
 - Consider how each feature and application will fit into your data management procedures
- Education, training, **communication** = key
- REDCap’s flexibility and ease of use... may lead to error/disaster
 - Test, test, and test again!
- **Northwestern REDCap administrators offer office hours, but it is essential that project owners take ownership and assume all responsibility for that project**

REDCap Resources

- REDCap Video Resources and Tutorials
 - <http://projectredcap.org>
 - Shared Library – a repository for REDCap data collection instruments and forms that can be downloaded and used (for free) by consortium partners
- University of Florida REDCap guides
 - <https://www.ctsi.ufl.edu/research/study-design-and-analysis/redcap/redcap-user-guides>
- Checklist on DigitalHub
 - <http://dx.doi.org/10.18131/G39311>

REDCap at Northwestern

- Online session for New Project Owners (email for access)
 - redcap@northwestern.edu
- Log on to REDCap (must be on campus network for VPN)
 - <https://redcap.nubic.northwestern.edu/redcap/>
- REDCap Intro Session & Office Hours
 - <https://nucats.northwestern.edu/>
- All users must complete: REDCap User Agreement
 - <https://redcap.nubic.northwestern.edu/redcap/surveys/?s=WK39RMR44F>

Citing REDCap

- Cite NUCATS grant support in publications relating to your projects
 - "REDCap is supported at FSM by the Northwestern University Clinical and Translational Science (NUCATS) Institute, Research reported in this publication was supported, in part, by the National Institutes of Health's National Center for Advancing Translational Sciences, Grant Number UL1TR001422. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health."
- Also cite the REDCap project when publishing manuscripts
 - <https://projectredcap.org/resources/citations/>

BCC: Biostatistics Collaboration Center

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- Request an Appointment
 - <http://www.feinberg.northwestern.edu/sites/bcc/contact-us/request-form.html>
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