Optimizing use of REDCap in Research

Jody D. Ciolino, PhD
Assistant Professor
Department of Preventive Medicine – Biostatistics
Northwestern University
Objectives:

1. Identify key study team members
2. List and implement steps in development of a REDCap database
3. Identify checks before moving a REDCap database from development to production
4. Describe advanced REDCap functionality
5. Determine appropriate use cases
Outline

- Team members’ perspectives
- What is REDCap?
- Basic Features + Tips
- Advanced Features
- Checklist before production
- Questions and Answers
My perspective

• Statisticians often focus on the methods of analyzing data and/or study design methods

Study design → study conduct → analysis methods
My perspective

• As a statistician, I tend to focus on controlling two things:
  • Bias
  • Variability

• But study conduct (capturing and managing data) can impact these two things
My perspective

• My job = tell a story with the data and analyses
• But…

• Study design → study conduct → analysis methods
• How can I tell a story if I only know the beginning and the end?
• personal interest in database design/maintenance and data entry
Other perspectives...the key players

- Those that will enter the data
- Those that will build/maintain the database
- Those that will analyze the data
The key players

- This may be just one person
- This may be three people
- This may be a large number of people within each role
Each perspective has its own agenda

• Enterers:
  • Clean, easy, efficient data capture
  • Ease burden on study participants
  • Minimize opportunity for data entry error
Each perspective has its own agenda

- Analyzers:
  - Clean data upon export/study completion
  - Data that are easily merged and reformatted
  - Data that ‘tell the story’ planned
Each perspective has its own agenda

• Designers/Maintainers:
  • Meet the needs of enterers + analyzers (these can be conflicting)
  • Efficient capture of clean data
  • ‘Hands-off’ post-production
The key players

- As we move through this talk, keep these key players and their perspectives in mind

- Appropriate use of REDCap (or any platform) will involve a compromise for all team members
What is REDCap?

- Research Electronic Data Capture
- Used for building and managing surveys and study databases efficiently, on a fixed budget, and securely
- Developed at Vanderbilt University in 2004
- Over 2700 institutions in over 100 countries
Why use REDCap?

- FREE
- Secure
- Easy to learn
- Easily accessible and becoming universal
Why use REDCap?

Its features (when used appropriately)…

Allow for efficient and flexible capture of clean study data
Getting started

• Institutions will vary
• Contact support staff to get set up (redcap@northwestern.edu)
• You will inevitably have to complete a few agreements and/or training sessions
Getting Started at NU

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

• Development mode → production mode
• Development: design, customize, test
• Production: live data capture, minimal modifications
Getting started:

Welcome to REDCap!

REDCap is a mature, secure web application for building and managing online surveys and databases. Using REDCap's streamlined process for rapidly developing projects, you can create and design projects using 1) the online method from your web browser using the Online Designer; and/or 2) the offline method by constructing a 'data dictionary' template file in Microsoft Excel, which can later be uploaded into REDCap. Both surveys and databases (or a mixture of the two) can be built using these methods.

REDCap provides automated export procedures for seamless data downloads to Excel and common statistical packages (SPSS, SAS, Stata, R), as well as a built-in project calendar, a scheduling module, ad hoc reporting tools, and advanced features such as branching logic, file uploading, and calculated fields.

Learn more about REDCap by viewing a brief summary video (4 min). If you would like to view other quick video tutorials of REDCap in action and an overview of its features, please see the Training Resources page.

REDCap Features

Build online surveys and databases quickly and securely - Create and design your project rapidly using secure web authentication from your browser. No extra software is required.

Fast and flexible - Conception to production-level survey/database in less than one day.

Export data to common data analysis packages - Export your data to Microsoft Excel, PDF, SAS, Stata, R, or SPSS for analysis.

Ad Hoc Reporting - Create custom queries for generating reports to view or download.

Schedule - Utilize a built-in project calendar.
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.

<table>
<thead>
<tr>
<th>Project Title</th>
<th>Records</th>
<th>Fields</th>
<th>Instrument</th>
<th>Type</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASHER Registry</td>
<td>122</td>
<td>2,337</td>
<td>14 forms</td>
<td></td>
<td></td>
</tr>
<tr>
<td>OPTI-MOM</td>
<td>80</td>
<td>2,761</td>
<td>9 forms</td>
<td></td>
<td></td>
</tr>
<tr>
<td>OPTI-MOM Safety</td>
<td>3</td>
<td>73</td>
<td>1 form</td>
<td></td>
<td></td>
</tr>
<tr>
<td>OPTI-MOM Specimen Tracking</td>
<td>156</td>
<td>10</td>
<td>1 form</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pharmacokinetics of Lamotrigine in Pregnant and Postpartum Women with</td>
<td>1</td>
<td>879</td>
<td>14 forms</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bipolar Disorder</td>
<td></td>
<td></td>
<td>1 Survey</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pharmacokinetics of Quetiapine Across Pregnancy and Postpartum</td>
<td>0</td>
<td>891</td>
<td>14 forms</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Establishing a methodology to assay CO in peripheral human blood</td>
<td>36</td>
<td>81</td>
<td>4 forms</td>
<td></td>
<td></td>
</tr>
<tr>
<td>OPTI-MOM Pitt</td>
<td>1</td>
<td>2,761</td>
<td>9 forms</td>
<td></td>
<td></td>
</tr>
<tr>
<td>OPTI-MOM UTMB</td>
<td>2</td>
<td>2,761</td>
<td>20 forms</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Investigating Serum Concentrations of Mood Stabilizing Medications in</td>
<td>0</td>
<td>460</td>
<td>18 forms</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pregnancy and Postpartum</td>
<td></td>
<td></td>
<td>5 Survey</td>
<td></td>
<td></td>
</tr>
<tr>
<td>COMPASS</td>
<td>2,154</td>
<td>314</td>
<td>7 forms</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Perinatal Psychiatric Emergencies</td>
<td>38</td>
<td>250</td>
<td>5 forms</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Retinoid</td>
<td>1</td>
<td>208</td>
<td>1 Survey</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nifedipine</td>
<td>4</td>
<td>347</td>
<td>12 forms</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CYP Specimen Tracking</td>
<td>8</td>
<td>6</td>
<td>1 form</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CDA-GEM</td>
<td>0</td>
<td>1,205</td>
<td>21 forms</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FANSAMAT</td>
<td>3</td>
<td>1,089</td>
<td>18 forms</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Gastroenterology</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
OPTI-MOM

**Project status:** Production

### Main project settings

Some options below are disabled because they may not be modified once the project is in production status.

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

### Design your data collection instruments & enable your surveys

Add or edit fields on your data collection instruments (survey and forms). This may be done by either using the Online Designer (online method) or by uploading a Data Dictionary (offline method). You may then enable your instruments to be used as surveys in the Online Designer.

Quick links: [Download PDF of all instruments](#) OR [Download the current Data Dictionary](#)

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

### 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](#)

### Enable optional modules and customizations

Some options below are disabled because they may not be modified once the project is in production status.

- Enable [Repeatable instruments and events](#)
- Enable [Auto-numbering for records](#)
- Disable [Scheduling module (longitudinal only)](#)
- Enable [Randomization module](#)
- Enable [Designate an email field to use for invitations to survey participants](#)

**Additional customizations**

### Set up project bookmarks (optional)
Getting started

• If designing a prospective study database, almost always will use the longitudinal setting
Basic Features of Database Design

• Fields make up forms (data collection tools)
• Forms make up ‘events’
• ‘Events’ may be pre-defined or repeatable
• ‘Arms’ are collections of events
Designing your data collection tools

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

• NOTE: REDCap platform distinguishes between data entry forms (Case Report Forms [CRFs]) and surveys (may also serve as CRF for clinical study purposes)

• ‘Regular’ CRFs:
  • Data entry must occur by authorized REDCap user (study team member with access to the database)
  • NOT participant facing
Data collection tools

• NOTE: REDCap platform distinguishes between data entry forms (Case Report Forms [CRFs]) and surveys (may also serve as CRF for clinical study purposes)

• Surveys:
  • Can be participant facing (participants do not need to access REDCap database to complete electronically)
  • Can also be completed by a study team member directly in REDCap
  • Have additional settings that allow for greater flexibility (‘save and return later’, ‘survey queue’, etc.)
Data collection tools: online designer
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.

<table>
<thead>
<tr>
<th>Instrument name</th>
<th>Fields</th>
<th>View PDF</th>
<th>Instrument actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enrollment Checklist</td>
<td>14</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Demographics</td>
<td>9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medical History</td>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Treatment Allocation</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vitals</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Laboratory Assessment</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IP Tracking</td>
<td>9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Termination</td>
<td>6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Departures</td>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adverse Events</td>
<td>14</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Example eCRF:

**Event Name:** Baseline (Arm 1: Arm1)

<table>
<thead>
<tr>
<th>Study ID</th>
<th>1206</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Date of Birth</strong></td>
<td>01-14-1987</td>
</tr>
<tr>
<td><strong>Date of enrollment</strong></td>
<td>01-29-2018</td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td>31.04</td>
</tr>
<tr>
<td><strong>Sex</strong></td>
<td>Female, Male</td>
</tr>
<tr>
<td><strong>Race</strong></td>
<td>White, Black or African American, American Indian or Alaska Native, Asian, Native Hawaiian or Other Pacific Islander, Other</td>
</tr>
</tbody>
</table>
Data collection tools: data dictionary
**Recommendation:**

1. Design a few forms the ‘long’ way (manually) – online designer
2. Export data dictionary to learn format
3. Create additional forms via data dictionary and import – this will save time
Field types

- **Text** – single-line text box (characters and numbers)
- **Dropdown** – dropdown menu with multiple choice options
- **Radio** – radio button with multiple choice options
- **Calculated** – perform real-time calculations (e.g., age)
Less common (often discouraged) field types:

- 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)
Example field types:

<table>
<thead>
<tr>
<th>Field Type</th>
<th>Data Entry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date of Birth</td>
<td>05-10-1965</td>
</tr>
<tr>
<td>Date of enrollment</td>
<td>01-01-2017</td>
</tr>
<tr>
<td>Age</td>
<td>51.65</td>
</tr>
</tbody>
</table>
Example field types:

- **Ethnicity**
  - Radio Button
  - Not Hispanic or Latino
  - Hispanic or Latino
  - Not reported

- **Race**
  - Checkbox
  - Not Available
  - White
  - Black
  - Asian
  - Native Hawaiian/Other Pacific Islander
  - American Indian/Alaska Native
  - Other
  - Not reported
  - Check all that apply

- **Form Status**

- **Complete?**
  - Dropdown
  - Incomplete
Manual creation of a radio button

<table>
<thead>
<tr>
<th>Variable: age</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
</tr>
<tr>
<td>View equation</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Variable: sex</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
</tr>
<tr>
<td>Female</td>
</tr>
<tr>
<td>Male</td>
</tr>
</tbody>
</table>
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: Multiple Choice - Radio Buttons (Single Ans)

Field Label
Sex

Choices (one choice per line)
0. Female
1. Male

Variable Name (utilized during data export)
SEX

Required? Yes
Prompt if field is blank

Identifier? Yes
Does the field contain identifying information (e.g., name, SSN, address)?

Custom Alignment Right / Vertical (RV)

Field Note (optional)
Small reminder text displayed underneath field

Save Cancel
Text boxes
Text boxes: Validation

‘Hard validation’: error message + data value will not be saved (it does not conform to the format specified)
Text boxes: Validation

‘Hard validation’: error message + data value will not be saved (it does not conform to the format specified)
Text boxes: Validation

‘Soft validation’: data value is permissible, but warning will be displayed (e.g., Min/Max values)

The value you provided is outside the suggested range. (10 - 500). This value is admissible, but you may wish to verify.
Statistically speaking…

• Validation feature is invaluable in ensuring high-quality data for analyses
• Prevents many headaches later…
• Example:
Excel vs. REDCap

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>pat_id</td>
<td>bp</td>
</tr>
<tr>
<td>2</td>
<td>1001</td>
<td>124/76</td>
</tr>
<tr>
<td>3</td>
<td>1002</td>
<td>132/90</td>
</tr>
<tr>
<td>4</td>
<td>1003</td>
<td>140/85</td>
</tr>
<tr>
<td>5</td>
<td>1004</td>
<td>nd</td>
</tr>
<tr>
<td>6</td>
<td>1005</td>
<td>not done</td>
</tr>
</tbody>
</table>

**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**

Blood Pressure (Systolic):

**Variable Name** (utilized during data export)

*vmi_bps*

ONLY letters, numbers, and underscores

**Validation?** (optional)

*Integer*

Minimum: 50

Maximum: 300
Required and identifier fields
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

<table>
<thead>
<tr>
<th>Blood Pressure (Systolic):</th>
<th>* must provide value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blood Pressure (Diastolic):</td>
<td>* must provide value</td>
</tr>
</tbody>
</table>
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
Matrix of fields

- Ideal for grouping of questions that share same response options (e.g., 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
**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.

<table>
<thead>
<tr>
<th>Field Label</th>
<th>Variable Name</th>
<th>Required?</th>
<th>Field Annotation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cancer</td>
<td>cancer_hx</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heart disease</td>
<td>heart_hx</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lung disease</td>
<td>lung_hx</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Circulatory problems</td>
<td>circ_hx</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mental health disorders</td>
<td>mh_hx</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Matrix Column Choices**
Choices (one choice per line)
- 0, No
- 1, Yes

**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:
med_hx
What is a matrix group name?
**Indicate whether the participant has a history of any of the following conditions:**

<table>
<thead>
<tr>
<th>Condition</th>
<th>No</th>
<th>Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cancer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heart disease</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lung disease</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Circulatory problems</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mental health disorders</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Slight digression – The codebook
Codebook

- Easy-to-read version of project’s Data Dictionary
- Quick reference for viewing field attributes
- Updated in real-time

<table>
<thead>
<tr>
<th>#</th>
<th>Variable / Field Name</th>
<th>Field Label</th>
<th>Field Attributes (Field Type, Validation, Choices, Calculations, etc.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>studyid</td>
<td>Study ID</td>
<td>text</td>
</tr>
<tr>
<td>2</td>
<td>incl_header</td>
<td>Section Header: Enrollment Checklist</td>
<td>descriptive</td>
</tr>
<tr>
<td>3</td>
<td>hypertensive</td>
<td>Is the participant hypertensive (defined as SBP/DBP &gt;= 140/90)?</td>
<td>yes/no</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1 Yes</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>0 No</td>
</tr>
<tr>
<td>4</td>
<td>age_18</td>
<td>Is the participant at least 18 years of age?</td>
<td>yes/no</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1 Yes</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>0 No</td>
</tr>
</tbody>
</table>
Branching (‘skip’) logic
Branching ('skip') logic

- Information from other fields determines whether another field will be displayed
- Statistically speaking...this is yet another invaluable data quality tool that will make data cleaning prior to analyses much easier
Branching Logic may be employed when fields/questions need to be hidden under certain conditions. If branching logic is defined, the field will only be visible if the conditions provided are true (i.e. show the field only if...). You may specify those conditions in the text box below for the Advanced Branching Logic Syntax or by choosing the Drag-N-Drop Logic Builder method, which allows you to build your logic in a much easier fashion by simply dragging over the options you want. You may switch back and forth between each method if you wish, but please be aware that since the advanced logic allows for greater complexity, it may not be able to be switched over to the Drag-N-Drop method if it becomes too complex.

Choose method below for the following field: negpregnant - Is there a negative pregnancy test?

- **Advanced Branching Logic Syntax**

  
  Show the field ONLY if...
  
  \[\text{[premeno]} = '1'\]

  Valid
  Test logic with a record: select record --

- **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)
  - birthcontrol = Yes (1)
  - birthcontrol = No (0)

  Show the field ONLY if...
  - ALL below are true
  - ANY below are true
Summary on form and field specification

- Surveys ≠ CRFs
- Multiple options for designing forms (online vs. data dictionary)
- Easily implemented features to ensure integrity and security:
  - Validations on text boxes
  - Identifier fields on PHI
  - Branching logic for fields that are not applicable in many instances
REDCap Events and ‘Arms’
Events and ‘Arms’

- **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)
OPTI-MOM

Project status: Production
Completed steps 8 of 8

Main project settings
- Some options below are disabled because they may not be modified once the project is in production status.
- **Complete!** Use surveys in this project? [ ]
- **Complete!** Use longitudinal data collection with defined events? [ ]
- Modify project title, purpose, etc.

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

Define your events and designate instruments for them
- **Complete!**
  - Create events for re-using data collection instruments and/or use in scheduling.
  - Go to: Define My Events or Designate Instruments for My Events

Enable optional modules and customizations
- Some options below are disabled because they may not be modified once the project is in production status.
- **Complete!** Repeatable instruments and events [ ]
- **Complete!** Auto-numbering for records [ ]
- **Complete!** Scheduling module (longitudinal only) [ ]
- **Complete!** Randomization module [ ]
- **Complete!** Designate an email field to use for invitations to survey participants [ ]
- Additional customizations

Set up project bookmarks (optional)
<table>
<thead>
<tr>
<th>Event #</th>
<th>Days Offset</th>
<th>Offset Range Min / Max</th>
<th>Event Name</th>
<th>Unique event name (auto-generated)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0</td>
<td>-0/+0</td>
<td>Consent</td>
<td>consent_arm_1</td>
</tr>
<tr>
<td>2</td>
<td>0</td>
<td>-0/+0</td>
<td>V1 Baseline</td>
<td>v1_baseline_arm_1</td>
</tr>
<tr>
<td>3</td>
<td>28</td>
<td>-14/+14</td>
<td>V2 Prenatal</td>
<td>v2_prenatal_arm_1</td>
</tr>
<tr>
<td>4</td>
<td>56</td>
<td>-14/+14</td>
<td>V3 Prenatal</td>
<td>v3_prenatal_arm_1</td>
</tr>
<tr>
<td>5</td>
<td>84</td>
<td>-14/+14</td>
<td>V4 Prenatal</td>
<td>v4_prenatal_arm_1</td>
</tr>
<tr>
<td>6</td>
<td>112</td>
<td>-14/+14</td>
<td>V5 Prenatal</td>
<td>v5_prenatal_arm_1</td>
</tr>
<tr>
<td>7</td>
<td>140</td>
<td>-14/+14</td>
<td>V6 Prenatal</td>
<td>v6_prenatal_arm_1</td>
</tr>
<tr>
<td>8</td>
<td>168</td>
<td>-14/+14</td>
<td>V7 Prenatal</td>
<td>v7_prenatal_arm_1</td>
</tr>
<tr>
<td>9</td>
<td>196</td>
<td>-14/+14</td>
<td>V8 Prenatal</td>
<td>v8_prenatal_arm_1</td>
</tr>
<tr>
<td>10</td>
<td>224</td>
<td>-14/+14</td>
<td>V9 Prenatal</td>
<td>v9_prenatal_arm_1</td>
</tr>
<tr>
<td>11</td>
<td>252</td>
<td>-14/+14</td>
<td>V10 Prenatal</td>
<td>v10_prenatal_arm_1</td>
</tr>
<tr>
<td>12</td>
<td>280</td>
<td>-14/+14</td>
<td>V11 Prenatal</td>
<td>v11_prenatal_arm_1</td>
</tr>
</tbody>
</table>
Designating instruments for events

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Screen Consent Eligibility</td>
<td>✔</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Consent Change</td>
<td></td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Participant Status</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>✔</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Visit Compliance</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>✔</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SSRI Dose Trajectory</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>✔</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Concomitant Medications</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>✔</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diagnosis Trajectory</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>✔</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Concentration</td>
<td></td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Blood Draw</td>
<td></td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Vitals</td>
<td></td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Visit Medical Information</td>
<td></td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Alcohol Cigarette And Other Drug Use</td>
<td></td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Abbreviated Asberg Side Effect (ASE)</td>
<td></td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Rx Drug Change Intake</td>
<td></td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
</tbody>
</table>
Repeatable Instruments + Events

• In previous example: pre-programmed 11 prenatal events
• Reason: uncertain number of visits per woman
• Additional problem: capturing information around a dose change (again, uncertain number of these: possibility for zero to many)…
Luckily, there is now an alternative to this… **repeatable events**
• Set up as a longitudinal study →

• Create instruments →

• Designate instruments for events →

• Enable repeatable events customizations →
An excellent way to collect repeating data in REDCap is to use repeatable instruments and/or repeatable events. This is sometimes called one-to-many data collection. Some examples may include but are not limited to the following: data from multiple visits or observations, concomitant medications, adverse events, or repetitive surveys (daily, weekly, etc.).

Below you can specify a data collection instrument or a whole event of instruments to be infinitely repeatable, in which each repeating instrument or event can be repeated a different number of times for each record. You may set any event in the project to be repeatable or alternatively set selected instruments to be repeatable within an event. The ‘Repeat Entire Event’ option means that all the event’s instruments will repeat together and stay connected, whereas the ‘Repeat Instruments’ option implies that the instruments will repeat separately and independently from each other on that event. Once an instrument or event is set to repeat, you will see options on the Record Home Page to add another instance of the instrument/event for the currently selected record.

<table>
<thead>
<tr>
<th>Event Name</th>
<th>Repeat entire event or selected instruments?</th>
<th>Instrument name (select instruments to repeat)</th>
<th>Custom label for repeating instruments (optional)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intake</td>
<td>Repeat Instruments (repeat)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Follow-up</td>
<td>Repeat Entire Event (repeat)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Which is better?

• This will depend on the situation: study design, the study team, etc.
• Will require input from all key players (enterers, builders, analyzers)
• Compare “Record Status Dashboards”: 
### OPTI-MOM dashboard
**(pre-programmed visits)**

<table>
<thead>
<tr>
<th>Record ID</th>
<th>Screen Consent Eligibility</th>
<th>Consent Status</th>
<th>Concomitant Medications</th>
<th>Visit Compliance</th>
<th>Baseline</th>
<th>Blood Draw</th>
<th>Visit Medical Information</th>
<th>Alcohol Cigarette Use</th>
<th>Other Drug Use</th>
<th>Edinburgh Postnatal Depression Scale (EPDS)</th>
<th>Generalized Anxiety Disorder (GAD-7)</th>
<th>Quick Inventory of Depression Symptomatology (QIDS)</th>
<th>Global Health</th>
<th>Global Motor Function</th>
<th>Adverse Childhood Experience (ACE)</th>
<th>Chronic Medical Conditions (CMC)</th>
<th>Mood Disorder Questionnaire (MDQ)</th>
</tr>
</thead>
<tbody>
<tr>
<td>HT05-5001</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HT05-5002</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HT05-5003</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HT05-5004</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HT05-5005</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Individual record:

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Screen Consent Eligibility</td>
<td>✔️</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Consent Change</td>
<td></td>
<td>✔️</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Participant Status</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Visit Compliance</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SSRI Dose Trajectory</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Concomitant Medications</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diagnosis Trajectory</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Concentration</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>Blood Draw</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>Vitals</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>Visit Medical Information</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>Alcohol Cigarette And Other Drug Use</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>Abbreviated Astberg Side Effect (ASE)</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>Edinburgh Prenatal Depression Scale (EPDS) (survey)</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>Generalized Anxiety Disorder (GAD-7) (survey)</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>Quick Inventory Depressive Symptomatology (QIDS) (survey)</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>Global Health (survey)</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>Demographics (survey)</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>Adverse Childhood Experience (ACE) (survey)</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>Chronic Medical Conditions (CMC) (survey)</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>Mood Disorder Questionnaire (MDQ) (survey)</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>Mini International Neuropsychiatric Interview v6 (MINI)</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>Antidepressant Treatment History Form (ATUP)</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
</tr>
</tbody>
</table>
Another protocol (Retinoid): repeatable events

- Dashboard:
Retinoid individual record

(repeatable follow-up events)
Of note: the export on studies set up
with repeatable events will be more
complex...
Example export:

- `redcap_event_name = default variable name`
- `redcap_repeat_instance = default variable name`
  - If blank – this is not a repeating event (`intake_arm_1`)
  - Instance # will allow for designation of unique events per participant

<table>
<thead>
<tr>
<th>record_id</th>
<th>redcap_event_name</th>
<th>redcap_repeat_instance</th>
<th>scr_age</th>
<th>scr_preg13</th>
<th>scr_sgle_gest</th>
<th>scr_bd_time</th>
</tr>
</thead>
<tbody>
<tr>
<td>RET-0004</td>
<td>intake_arm_1</td>
<td></td>
<td>25</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>RET-0004</td>
<td>followup_arm_1</td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RET-0004</td>
<td>followup_arm_1</td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RET-0004</td>
<td>followup_arm_1</td>
<td></td>
<td></td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RET-0004</td>
<td>followup_arm_1</td>
<td></td>
<td></td>
<td>3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Basic Features of Database Design

• Fields make up forms (data collection tools)
• Forms make up ‘events’
• ‘Events’ may be pre-defined or repeatable
• ‘Arms’ are collections of events
User Rights

• 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.)
COURSE: Practice Clinical Trial Hypertension

Main project settings
- Use surveys in this project?
- Use longitudinal data collection with defined events?

Design your data collection instruments & enable your surveys
- Add or edit fields on your data collection instruments (survey and forms). This may be done by either using the Online Designer (online method) or by uploading a Data Dictionary (offline method). You may then enable your instruments to be used as surveys in the Online Designer.

Define your events and designate instruments for them
- Create events for re-using data collection instruments and/or set up scheduling.
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
    - Do-identified means that all free-form text fields will be removed, as well as any date/time fields and Identifier fields.
  - 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

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.

<table>
<thead>
<tr>
<th>Data Entry Rights</th>
<th>No Access</th>
<th>Read Only</th>
<th>View &amp; Edit</th>
<th>Edit survey responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Screen Consent Eligibility</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Consent Change</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Participant Status</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Visit Compliance</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SSRI Dose Trajectory</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Concomitant Medications</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diagnosis Trajectory</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Concentration</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blood Draw</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vitals</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Visit Medical Information</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alcohol Cigarette And Other Drug Use</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Abbreviated Asberg Side Effect (ASB)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rx Drug Change Intake</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Edinburgh Postnatal Depression Scale (EPDS) (survey)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Generalized Anxiety Disorder (GAD-7) (survey)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Basic Data Entry
Data entry

On the left-hand side, “Add/Edit Records” or “Record Status Dashboard”
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 record begin to type in it, allowing you to select it.

<table>
<thead>
<tr>
<th>Total records: 8</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Choose an existing Study ID</strong></td>
</tr>
<tr>
<td><strong>Enter a new or existing Study ID</strong></td>
</tr>
</tbody>
</table>

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.
**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.

### NEW Study ID 9999

<table>
<thead>
<tr>
<th>Data Collection Instrument</th>
<th>Baseline</th>
<th>Week2</th>
<th>Week4</th>
<th>Week6</th>
<th>Week8</th>
<th>Week10</th>
<th>Week12</th>
<th>Ad Hoc</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enrollment Checklist</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Demographics</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medical History</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Treatment Allocation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vitals</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Laboratory Assessment</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IP Tracking</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Termination</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Departures</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adverse Events</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Data Entry/Status icons – all forms in REDCap have this final dropdown field

Legend for status icons:

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

1. Make use of this status icon feature
2. Example:
   a) 1\textsuperscript{st} pass – leave ‘unverified’
   b) 2\textsuperscript{nd} pass – ‘complete’
   c) Upon export, filter/subset data based on form status
Summary – basic features

• Fields make up forms
• Forms make up ‘events’
• ‘Events’ may be pre-defined or repeatable
• ‘Arms’ are collections of events
• Consider key perspectives on deciding design features
• Data entry from left panel – red, yellow, green indicators for completeness of data entry
Advanced Features

Randomization
Application Programming Interface
Reports and Graphs
Data Resolution Workflow
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’
Randomization in REDCap

- Differing rights:
  - **Setup** (programmer/analyst/statistician)
  - **Dashboard** (unblinded personnel)
  - **Randomize** (unblinded personnel performing randomization)
- To set up: select this option on the Project Setup checklist tab
Example: Hypothetical Clinical Trial

<table>
<thead>
<tr>
<th>Instrument name</th>
<th>Fields</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enrollment Checklist</td>
<td>14</td>
</tr>
<tr>
<td>Demographics</td>
<td>9</td>
</tr>
<tr>
<td>Medical History</td>
<td>5</td>
</tr>
<tr>
<td>Treatment Allocation</td>
<td>1</td>
</tr>
<tr>
<td>Vitals</td>
<td>4</td>
</tr>
<tr>
<td>Laboratory Assessment</td>
<td>4</td>
</tr>
<tr>
<td>IP Tracking</td>
<td>9</td>
</tr>
<tr>
<td>Termination</td>
<td>6</td>
</tr>
<tr>
<td>Departures</td>
<td>5</td>
</tr>
<tr>
<td>Adverse Events</td>
<td>14</td>
</tr>
</tbody>
</table>
Example: Hypothetical Clinical Trial
Set up Randomization

Enable optional modules and customizations

- 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

Additional customizations

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
Set up Randomization

May stratify on specific categorical variables if you choose →

- Field from the “Treatment Allocation” form →
- “treatmnt” coded 0,1
- Randomization table will be sequence of 0s and 1s
STEP 2: Download template allocation tables (as Excel/CSV files)

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

- Example #1 (basic)
- Example #2 (all possible combos)
- Example #3 (5x all possible combos)

- Give template to your programmer/statistician/person responsible for generating the allocation scheme
- This sequence is generated externally and imported into REDCap
STEP 3: Upload your allocation table (CSV file)

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

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

---

**Upload allocation table (CSV file) for use in DEVELOPMENT status**

- **Choose File**: No file chosen
- **Upload File**

---

**Upload allocation table (CSV file) for use in PRODUCTION status**

- **Choose File**: No file chosen
- **Upload File**
Randomization recommendations

- Work with a statistician to generate these tables
- Always add a ‘cushion’
- Always test thoroughly with study team involved
Randomization Recommendations

- Note: Tables will be ‘locked’ once in production
- Development randomization table CANNOT be the same as the production table
- Blinded studies are rather difficult to work out logistically
  - TEST
  - Use form-level restriction
  - Restrict dashboard and abilities to randomization by user
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
API Example: Crosstalk between projects

- OPTI-MOM study at Northwestern University
- Multiple specimen samples across multiple study visits
- Complex labeling conventions for each specimen
API Example: Crosstalk between projects

- Need to ‘track’ specimens somehow (external REDCap database)
  - Each individual specimen should be a new record in this database
  - LOTS of room for data entry error/failure to enter
- API functionality will allow us to pre-populate records in a new database →

<table>
<thead>
<tr>
<th>Record ID</th>
<th>Specimen Tracking</th>
</tr>
</thead>
<tbody>
<tr>
<td>HT05-5001-PRG1-MDNA-S</td>
<td><img src="empty" alt="Green" /></td>
</tr>
<tr>
<td>HT05-5001-PRG1-PL-S</td>
<td><img src="empty" alt="Green" /></td>
</tr>
<tr>
<td>HT05-5001-PRG2-PL-S</td>
<td><img src="empty" alt="Green" /></td>
</tr>
<tr>
<td>HT05-5001-PRG3-PL-S</td>
<td><img src="empty" alt="Green" /></td>
</tr>
<tr>
<td>HT05-5001-PRG4-PL-S</td>
<td><img src="empty" alt="Green" /></td>
</tr>
<tr>
<td>HT05-5001-PRG5-PL-S</td>
<td><img src="empty" alt="Gray" /></td>
</tr>
</tbody>
</table>
Crosstalk between projects

- Coordinator(s) now only need to update status in Specimen Tracking Database (will not need to enter manually):
How does this work?

• REDCap support grants API token (process for obtaining is institution specific)
• This ‘token’ is used in external software (e.g., R) code to automatically export the data, restructure the data, and import into the new database
Example R Script

# User needs to replace the [API token] and [Import token] with the his/her assigned OPTI-MOM and
# OPTI-MOM specimen project tokens before running the program

#install redcapAPI package if not already installed
if(!require(redcapAPI)){
  install.packages("redcapAPI")
  library(redcapAPI)
}

# Set up connection to NU REDCap
# The token_ex is the token for the main OPTI-MOM project
# Token is user specific.
# Replace [API token] below with your assigned OPTI-MOM project token which can be found
# inside OPTI-MOM project---API

redcap_url <- "https://redcap.nubic.northwestern.edu/redcap/api/
token_ex <- "xxxxxxxxxxxxxxxxxxxxx"

# rcon is the connect for data EXPORT from OPTI-MOM
rcon <- redcapConnection(url=redcap_url, token=token_ex)

# Export all the records' blood draw form data into bd
bd <- exportRRecords(rcon, forms="blood_draw")

# Data cleaning--extract relevant sample label fields into bd
bd[d[!is.na(bd$blood_draw_complete), "blood_draw_complete")]

# Create a data frame of the sample labels and name it as "record_id"
# import data frame([import])
API Example: Automatic export and reporting

• In OPTI-MOM (same study), we need to continually monitor data for quality and integrity
• Manual data export is possible, but requires time…
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 your data from REDCap to open or view in Excel or various stats packages.

Build custom reports for quick views of your data, and export reports to Excel/CSV.

Build or execute data quality rules to find discrepancies and errors in your project data.

Grant new users access to this project or modify user privileges for current users.

**Data Exports, Reports, and Stats**

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 Microsoft 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 as a report, then Report A is the best and quickest way. However, if you want to view or export data from only specific instruments (or events) on the fly, then Report B is the best choice. You may also create your own custom reports below (if you have such privileges) in which you can filter the report to specific fields, records, or events using a vast array of filtering tools to make sure you get the exact data you want. Once you have created a report, you may view it as a webpage, export it out of REDCap in a specified format (Excel, SAS, Stata, SPSS, R), or view the plots and descriptive statistics for that report.

<table>
<thead>
<tr>
<th>My Reports &amp; Exports</th>
<th>View/Export Options</th>
<th>Management Options</th>
<th>Report ID</th>
</tr>
</thead>
<tbody>
<tr>
<td>All data (all records and fields)</td>
<td>![View Report] ![Export Data] ![Stats &amp; Charts]</td>
<td></td>
<td>(auto-generated)</td>
</tr>
</tbody>
</table>
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. Given that you have limited export rights, you may NOT uncheck the option below to 'remove all tagged identifier fields'.

Known Identifiers:
- Remove all tagged identifier fields (tagged in Data Dictionary)
- Hash the Record ID field (converts record name to 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
- Also shift all survey completion timestamps by value between 0 and 364 days

Additional export options

- Export survey identifier field and survey timestamp field(s)?
API Example: Automatic export and reporting

- To do this every day, would be tedious and time consuming
- Solution: use API to automatically export
- This time, we used SAS and included token in SAS code
From 3001 Paper code:

Step 1. Define file names and macros variables for the project-specific token.

File name for API parameters that define the request sent to REDCap API. Will be created in a DATA step. Extension can be .csv, .txt, .dat **.**

```/parameters for consent event/*

//**NOTE: saved in C: \ CICINO code as this has token information**/
filename cons_in "S:\Psychiatry \ Behavioral_Sciences\OPRC\OPTI-MOM\STATE\CICINO\Code\api_parameter_consent.txt";
```

```*** .CSV output file to contain the exported data **.***
//**NOTE: Saved as csv files in Datasets folder-Database Team has access to these files**/
filename cons_out "S:\Psychiatry \ Behavioral_Sciences\OPRC\OPTI-MOM\DATA\Data_Status_and_Quality\Datasets\consent_event.csv";
```

```*** Output file to contain PROC SQL status information returned from REDCap API (this is optional) **.***
//**Commented out for now**/
filename status "S:\Psychiatry \ Behavioral_Sciences\OPRC\OPTI-MOM\DATA\Data_Status_and_Quality\Output\redcap_status.txt";
```

```/** Project- and user-specific token obtained from REDCap **/
let mytoken = XXXXXXXXXXXXX;
```

Step 2. Request observations

May consider consulting the 'API Playground' for more
parameter calls for specific forms/events/fields

```/** specify field names to get rid of the note fields on screen consent form
screen consent form must be exported with other forms because it contains record id information**/
data_null ;
file cons_in ;
put "NRSt(token=mytoken\NRSt\content=record_id\type=flat\format=csv\events=consent\arm_1"
fields=record_id_redcap_event_name,scr_date,scr_age,scr_cat,scr_subcat,scr_time,scr_med_hb,scr_drugs,scr_english,scr_preg15,scr_est_who,scr_dapt_enc,scr_comments,slip_scrib,scr_dna,e_inf_outcomes,e_inf_decline,
e_inf_dna,e_probe);run;```
After export + some SAS code…

<table>
<thead>
<tr>
<th>OPTI-MOM Protocol: Northwestern</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participant Status Report</td>
</tr>
<tr>
<td><strong>Depression/Anxiety Assessments by Participant</strong></td>
</tr>
<tr>
<td>Demographics by Participant</td>
</tr>
<tr>
<td>Dose Blood Draw Lag Time by Participant</td>
</tr>
<tr>
<td>SSRI trajectory by Participant</td>
</tr>
<tr>
<td>Specimen Label Check</td>
</tr>
<tr>
<td>ASE by Participant</td>
</tr>
<tr>
<td>Safety - AE</td>
</tr>
<tr>
<td>Safety - Protocol Departure</td>
</tr>
<tr>
<td>Drug Type Check</td>
</tr>
<tr>
<td>SpecialDSQR by Participant</td>
</tr>
</tbody>
</table>
All Participants Enrolled to Date
02/28/2018

(Click on Participant ID for detailed Depression/Anxiety Self-Report listings)

<table>
<thead>
<tr>
<th>EPDS</th>
<th>GAD</th>
<th>QIDS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>Min</td>
<td>Max</td>
</tr>
<tr>
<td>4.01</td>
<td>0.00</td>
<td>15.00</td>
</tr>
</tbody>
</table>

Participant ID

- HT02-2001
- HT05-5001
- HT05-5028
- HT05-5029
REDCap API notes

- Powerful functionality
- Requires substantial programming efforts
- Requires careful considerations for security/integrity:
  - Tokens
  - Storage of output
  - Overwriting data
Reports and Graphs (within REDCap)
Reports

- Generate real-time reports and specify fields to display within REDCap
- Left-hand panel of applications “Reports”
- Edit reports → Create report…
**STEP 1**

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

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

**STEP 2**

**Fields to include in report**

<table>
<thead>
<tr>
<th>Field 1</th>
<th>Field 2</th>
<th>Field 3</th>
<th>Field 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>record_id &quot;Record ID&quot;</td>
<td>epds_q10 &quot;10. The thought of harming&quot;</td>
<td>qlds_12 &quot;12. Thoughts of my own dear&quot;</td>
<td>Type variable name or field label</td>
</tr>
</tbody>
</table>

Add all fields from selected instrument: -- choose instrument --
<table>
<thead>
<tr>
<th>Filter</th>
<th>Description</th>
<th>Operator/Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Filter 1</td>
<td>epds_q10 &quot;10. The thought of harming</td>
<td>= Sometimes</td>
</tr>
<tr>
<td>Filter 2</td>
<td>epds_q10 &quot;10. The thought of harming</td>
<td>= Quite often</td>
</tr>
<tr>
<td>Filter 3</td>
<td>epds_q10 &quot;10. The thought of harming</td>
<td>= Hardly ever</td>
</tr>
<tr>
<td>Filter 4</td>
<td>qids_12 &quot;12. Thoughts of my own death</td>
<td>= I felt that life was ever</td>
</tr>
<tr>
<td>Filter 5</td>
<td>qids_12 &quot;12. Thoughts of my own death</td>
<td>= I thought of suicide</td>
</tr>
<tr>
<td>Filter 6</td>
<td>qids_12 &quot;12. Thoughts of my own death</td>
<td>= I thought of suicide</td>
</tr>
<tr>
<td>Filter 7</td>
<td>Type variable name or field label</td>
<td>=</td>
</tr>
</tbody>
</table>

Switch format: Use advanced logic
### Additional Filters (optional)

Filter by event(s):
- Consent (Arm 1: Prenatal)
- V1 Baseline (Arm 1: Prenatal)
- V2 Prenatal (Arm 1: Prenatal)
- V3 Prenatal (Arm 1: Prenatal)
- V4 Prenatal (Arm 1: Prenatal)

(Records belonging only to ALL selections below will appear in the report)

### Live Filters (optional)

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

<table>
<thead>
<tr>
<th>Live Filter 1</th>
<th>[Events]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Live Filter 2</td>
<td>-- select a field --</td>
</tr>
<tr>
<td>Live Filter 3</td>
<td>-- select a field --</td>
</tr>
</tbody>
</table>

### Order the Results (optional)

<table>
<thead>
<tr>
<th>First by</th>
<th>record_id ‘Record ID’</th>
<th>Ascending order</th>
</tr>
</thead>
<tbody>
<tr>
<td>Then by</td>
<td>Type variable name or field label</td>
<td>Ascending order</td>
</tr>
<tr>
<td>Then by</td>
<td>Type variable name or field label</td>
<td>Ascending order</td>
</tr>
</tbody>
</table>
# EPDS_QIDS_Suicidality

<table>
<thead>
<tr>
<th>Event Name</th>
<th>10. The thought of harming myself has occurred to me (epds_q10)</th>
<th>12. Thoughts of my own death or suicide (qids_12)</th>
</tr>
</thead>
<tbody>
<tr>
<td>V5 Prenatal (Arm 1: Prenatal)</td>
<td>Hardly ever (1)</td>
<td>I didn’t think of suicide or death. (0)</td>
</tr>
<tr>
<td>Change 1 (Arm 3: Rx Drug Change Log)</td>
<td>Hardly ever (1)</td>
<td></td>
</tr>
<tr>
<td>V3 Prenatal (Arm 1: Prenatal)</td>
<td>Hardly ever (1)</td>
<td>I felt that life was empty or wondered if it was worth living. (1)</td>
</tr>
<tr>
<td>V1 Baseline (Arm 1: Prenatal)</td>
<td>Hardly ever (1)</td>
<td>I didn’t think of suicide or death. (0)</td>
</tr>
</tbody>
</table>
Another report example

Number of results returned: 151
Total number of records queried: 1,064
('records' = total available data across all designated events)

### Ncenters

<table>
<thead>
<tr>
<th>PubMed ID: pmid</th>
<th>Event Name</th>
<th>How many centers?</th>
</tr>
</thead>
<tbody>
<tr>
<td>190526330</td>
<td>Jody</td>
<td>291</td>
</tr>
<tr>
<td>190708899</td>
<td>Jody</td>
<td>85</td>
</tr>
<tr>
<td>190921405</td>
<td>Jody</td>
<td>20</td>
</tr>
<tr>
<td>191153041</td>
<td>Jody</td>
<td>59</td>
</tr>
</tbody>
</table>
You can select any point and navigate to the corresponding record.
Notes on reporting and graphs

• Quick and real-time
• Advanced filtering and formatting can be difficult
• Can export reports into .csv or any other format
• Useful for simple lists: enrollees by ID, screen failures, records meeting specific criteria (e.g., suicidality item example)
Data Resolution Workflow
Data Resolution Workflow

Another feature that allows for quality control and helps ensure data integrity
This pop-up displays the Data Resolution Workflow for the specified record for a given field and/or Data Quality rule. Users with appropriate user privileges may open data queries to begin a documented process of resolving an issue with the data. Opened data queries may thus be responded to by users with appropriate privileges, and then they may be closed once the issue has been resolved. All data queries can also be viewed on the Resolve Issues page in this project.

PubMed ID: **18819705**

Event: **Jody**

Field: **followup_reported** ("Was participant follow-up time reported?")

Status: **Not Opened**

<table>
<thead>
<tr>
<th>Date/Time</th>
<th>User</th>
<th>Comments and Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>02/16/2015 8:26am</td>
<td>jdc800</td>
<td>Data Changes Made: followup_reported = &quot;Yes (1)&quot;</td>
</tr>
<tr>
<td>03/03/2017 2:13pm</td>
<td>jdc800</td>
<td><strong>Verified data value</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td>— OR —</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Open query</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Assign query to a user (optional): -- select user --</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Comment (optional):</td>
</tr>
</tbody>
</table>
Data Resolution Workflow

Allows for opening of queries and log of all information surrounding queries

<table>
<thead>
<tr>
<th>Date/Time</th>
<th>User</th>
<th>Comments and Details</th>
</tr>
</thead>
</table>
| 02/11/2015 9:19pm | hal536 | Action: Opened query  
Assigned to user: hal536 (Hannah Louks)  
Comment: "Added no response (previously discussed)"

| 02/11/2015 9:22pm | hal536 | Data Changes Made:  
random_clear = 'No (0)' |
|-------------------|--------|----------------------------------------------------------------------------------|
| 02/16/2015 8:26am | jdc800 | Action: Closed query  
Comment: "agree" |
| 03/03/2017 2:15pm | jdc800 | Reopen the closed query  
Comment: |
Data Resolution Workflow

Use the resolution dashboard to see all queries
Data Resolution Workflow

- You may organize/filter so that you can only view closed, open, etc. queries
- You may also filter by assigned REDCap user
Moving from Development → Production
Things to check before moving to production…

Planning

- Primary and secondary outcomes captured (in correct format)
- Safety and exploratory data (when applicable) captured
- Primary predictors/covariates captured (in correct format)
Things to check before moving to production…

Design
- Forms present and in correct order
- Logical order (forms + fields within forms)
- Clear instructions; questions and options free of typos
- Consistent numeric coding schemes (0/1 for no/yes, etc.)
Things to check before moving to production…

Design, cont’d

- ‘Text’ fields have validation + consistent (units consistent, dates consistent format, add field notes to guide enterer)
- PHI fields marked as identifiers
- Studies with repeating forms/events – instructions/options applicable for all instances
- Forms match up appropriately with events (check schedule in protocol)
Enter test data

- Make ID such that obvious test data (e.g., ‘TEST1’)
- Branching logic works
- Calculated fields work
- Enter values that should not be permissible (e.g., negative values, values clearly out of range, character values that should not be permissible)
Enter test data

- Send surveys to yourself – online, save and return, hard copy, etc.
- Test out several randomizations (all team members involved)
- Export the test data
- Test out quality control/advanced features (e.g., Data Resolution Workflow, API, summary reports, etc.)
Launch your project

- Delete test data
- Update user rights (e.g., minimize rights for design modifications, data entry, etc.) – communicate to team members
- Move to production and notify team
Additional Notes + Resources
Limitations

- REDCap is intuitive, but there is a learning curve
- Differing institutions have different versions - enable/disable different features (e.g., overwrite survey data)
- REDCap *alone* may not be suitable for FDA-governed trials (i.e., under an IND)
  - It can be used, but there are additional regulatory considerations that study team must add into workflow
Caution/Pitfalls

• Sometimes: “less is more”
  • “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
Caution/Pitfalls

- Like many things, REDCap’s flexibility and ease of use may also open the door for error/disaster without proper education, due diligence, training, and communication.

- Test, test, and test again! (Checklist on DigitalHub: [http://dx.doi.org/10.18131/G39311](http://dx.doi.org/10.18131/G39311))

It is essential that project owners take ownership and assume all responsibility for that project.
Free one-week REDCap trial account

1. Go to https://redcapdemo.vanderbilt.edu/trial/
2. Enter information where prompted
3. Check your e-mail
4. Click the link to set your password
5. You may log into the demo site (https://redcapdemo.vanderbilt.edu/) for one week using your e-mail address and password
• [http://projectredcap.org](http://projectredcap.org)
  • REDCap Shared Library – a repository for REDCap data collection instruments and forms that can be downloaded and used (for free) by consortium partners
  • Video Resources – Webinars and tutorials
  • Community Website


• Clinical Research Data Management MOOC on Coursera (Six-week free course with hands-on applications in REDCap).
  • [https://www.coursera.org/learn/clinical-data-management](https://www.coursera.org/learn/clinical-data-management)
Questions + Answers

jody.ciolino@northwestern.edu