Creating Data Forms

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Collaborative Data Services (CDS)
Agenda

- Creating a data form using the *designer*
  - Significance of the record_id field
  - Field types & properties
  - Required fields and validation
  - Calculations
  - Branching
  - Matrix fields
  - Action tags
  - Copying fields & choices and piping
- Creating a form using the *data dictionary*
  - When to use the designer vs. data dictionary
- Creating a codebook & PDFs of data forms
- Development and production modes
  - Modifying production projects
- Next Steps
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Creating a data form using the designer

- Starting the designer
  - Click **Edit Instruments** link next to Data Collection on left-hand navigation bar
  - Click **Online Designer** button under Design your data collection instruments & enable your surveys under Project Setup tab
Initial Project

- For new projects using the Fred Hutch template, you will start with a single data collection instrument, **Sample Instrument**
- Do **not** delete this instrument; rename it instead
Your first form

- It will always have the `record_id` field
- **Don’t** delete this field; it is the primary key of your project.
- You may, however, rename it
Editing data forms in Designer

• Something to consider...
  • There is **no** save or cancel button for **schema** changes
  • All changes are immediate (when in development mode)
  • Thus, if you are making major changes, before you start...
    • You may want to make a backup copy of form
    • Or download and save data dictionary
Editing a field

• Clicking the pencil icon next to a field, brings you to the **Edit Field** dialog
• This dialog will vary depending on the **Field Type** selected
Adding a field

- Clicking the **Add Field** button, brings you to the **Add New Field** dialog.
- This dialog will again vary depending on the **Field Type** selected.
Field Types

- **Standard fields**
  - **Text Box**
    - REDCap supports autocomplete based on biomedical ontologies (e.g., ICD-10 codes).
  - **Notes Box** – paragraph of text
  - **Calculated Field** – numeric calculation
  - **Multiple Choice – Drop-down List** (Single Answer)
  - **Multiple Choice – Radio buttons** (Single Answer)
  - **Checkboxes** (Multiple Answers)
  - **Yes – No** – yes/no radio button
  - **True – False** – true/false radio button
  - **Signature** – draw signature with mouse or finger
  - **File Upload** – attach documents to form
  - **Slider / Visual Analog Scale** – slider from 1 to 100
  - **Descriptive Text** – does not capture data
  - **Begin New Section** – also does not capture data
  - **Dynamic Query** (SQL) – dropdown hooked up to another project. Requires admin to setup

- **Matrix fields** – adds a group of radio button or checkbox fields sharing same set of responses
Field Properties

- **Field Type** – type of field
- **Field Label** – the prompt the user sees
- **Variable Name** – the field name used at export and when branching and piping; *must be unique across entire project*
- **Validation** – simple validation
- **Required** – is field mandatory in order to save record?
- **Identifier** – does this contain PII?
- **Custom Alignment** – positions field (answers) on page
- **Field Note** – help text displayed underneath field in smaller font
- **Field Annotation** – note to designer or way to designate special field status; not displayed to data entry user
Required fields, identifier, & validation

• **Required**
  • Any field can be marked as required
  • Can be over-ruled by user at data entry time

• **Identifier**
  • Any field can be marked as Identifier
  • Will be stripped from exports (unless user has see “full data set” right)

• **Validation**
  • Only for textbox fields
  • Constrain user to entering valid date, integer, number, email address, phone number, zipcode, etc.
  • You can also specify min and max values for numeric/date types; but boundaries can be overridden at data entry time
Calculations

• Numeric calculations
  • **No text or date calculations!**
  • *Possible workarounds:* use branching logic to display alternate text messages; use Data Entry Triggers (a programming extension) for date calculations
• Reference field names using `[field_name]` syntax
• Can reference fields on other forms!
  • *When using longitudinal project (discussed in 301 seminar), you need to modify this syntax if field is from a different event*
• REDCap has a number of numeric, datetime, and boolean functions to support calculations (and branching, reports, and DQRs)
Copy value of field from another data form

[bas_height]
BMI Calculation (lbs/inches)

- Without rounding

$$\left(\frac{\text{bas_weight}}{\text{bas_height} \times \text{bas_height}}\right) \times 703$$

- With rounding

$$\text{round}\left(\left(\frac{\text{bas_weight}}{\text{bas_height} \times \text{bas_height}}\right) \times 703, 1\right)$$
Action Tags

- Added to REDCap in version 6.7
  - Goes in Field Annotation property of field
  - More added in version 7.6

<table>
<thead>
<tr>
<th>Action Tag</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>@HIDDEN</td>
<td>Hides the field on both the survey page and the data entry form. Field will stay hidden even if branching logic attempts to make it visible.</td>
</tr>
<tr>
<td>@HIDDEN-FORM</td>
<td>Hides the field only on the data entry form (i.e., not on the survey page). Field will stay hidden even if branching logic attempts to make it visible.</td>
</tr>
<tr>
<td>@HIDDEN-SURVEY</td>
<td>Hides the field only on the survey page (i.e., not on the data entry form). Field will stay hidden even if branching logic attempts to make it visible.</td>
</tr>
<tr>
<td>@READONLY</td>
<td>Makes the field read-only (i.e., disabled) on both the survey page and the data entry form so that its value cannot be changed.</td>
</tr>
<tr>
<td>@READONLY-FORM</td>
<td>Makes the field read-only (i.e., disabled) only on the data entry form (i.e., not on the survey page) so that its value cannot be changed.</td>
</tr>
<tr>
<td>@READONLY-SURVEY</td>
<td>Makes the field read-only (i.e., disabled) only on the survey page (i.e., not on the data entry form) so that its value cannot be changed.</td>
</tr>
</tbody>
</table>
Action Tags

- Version 7.6 added additional action tags, including
  - @HIDEBUTTON – use to hide today/now button for a date/time field
  - @HIDECHOICE – use to retire one or more choices for a multiple-choice field (radio, drop-down, checkbox)
  - @MAXCHECKED – specify max no. of checkboxes that can be checked
  - @MAXCHOICE – causes choice to be disabled after so many records have selected the choice
  - @NONEOFTHEABOVE – allows for a checkbox to designate one (or more than one) choice that is mutually exclusive of all other choices
  - @CHARLIMIT, @WORDLIMIT – for text & notes fields
  - @RANDOMORDER – randomizes order of choices
Branching

- You can use Drag-N-Drop or Advanced syntax

Choose method below for the following field: **os_foodallergy** - Do you have any food allergies, food intolerances...

**Advanced Branching Logic Syntax**
Show the field ONLY if...

--- OR ---

**Drag-N-Drop Logic Builder**
Displaying field choices for the following data collection instrument: **Online Screener**
Field choices from other fields (drag a choice below to box on right)
- subject_id = (define criteria)
- os_pg1 = Yes (1)

Show the field ONLY if...
- ALL below are true
- ANY below are true
Branching

- Example: displaying or hiding pregnancy question
Branching

• Checking if a field is not null (answered)

\[ \text{[os\_6appt]} \neq '' \]

• Checking if a field is null

\[ \text{[os\_6appt]} = '' \]

• Referencing checkbox field

\[ \text{[enr\_race(6)]} = '1' \]

For quotes, you can use either single (') or double ("), but be consistent in same expression!
Matrix Fields

You may add or edit a matrix (i.e. grid) of project fields on this data collection instrument by completing the fields below. By providing all necessary info below and clicking Save, the new matrix of fields will be added to the form on this page. A Field Label and Variable name must be provide for each field in the matrix, and you must also set the Choices (i.e. matrix column headers) and answer format (Single Answer vs. Multiple Answers) for the entire matrix. View a matrix example or Read more about matrix fields on the Help & FAQ.

Section Header Text (optional)
Please rate the following items with 1 to 5 scale

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

Field Label
- Happiness
- Sadness
- Anger

Variable Name
- happiness
- sadness
- anger

Enable auto naming of variable based upon its Field Label?

Matrix Column Choices
Choices (one choice per line)
1. very likely
2. likely
3. neither likely or unlikely
4. unlikely
5. very unlikely

How do I manually code the choices?

Other Matrix Info
Answer Format:
- Single Answer (Radio Buttons)

Ranking:
What is a ranked matrix of fields?

Matrix group name: ONLY letters, numbers, and underscores
stuff

What is a matrix group name?

Save  Cancel
Copying fields & choices

- Copy field

- Copy choices
Piping

- Allows you to copy the value from one field into various other places on a form
  - Field Label
  - Field Note
  - Section Header
  - Matrix field column headers
  - Option labels for multiple choice fields (radio, drop-down, checkbox)
  - Slider field labels (i.e. text displayed above slider bar)
  - Custom record locking text (if defined, displayed at bottom of form)
  - Survey Instructions
  - Survey Completion Text
  - Survey invitation emails (sent via Participant List or Automated Invitations) - includes both subject and message
- ...
- Simply use same syntax as when referring to fields in calculations and branching, i.e. [field_name]
Piping Example

- Designer

- Data entry time
Variable naming

- **Recommendation**
  - Use a short 2/3/4 letter prefix that represents the form name and an underscore before every field name (exception: don’t use for record_id field)

- dem_firstname
- bas_weight
- fu6_smoking
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Data Dictionary

• Everything discussed using Designer can also be done using the downloaded data dictionary
• You can develop projects using either...
  • Designer
  • Data Dictionary
  • or both!
• My style
  • I like to use Designer most of the time
  • But I use the Data Dictionary when I need to create similar fields multiple times on same form or on different forms or fix a bunch of fields because a change in field name used in branching logic in multiple places
Data Dictionary

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

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

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

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

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

Upload your Data Dictionary file (CSV file format only)
Format for min/max validation values for date and datetime fields: MM/DD/YYYY or YYYY-MM-DD

Choose File
No file chosen
Upload File
Data Dictionary

- Each column maps to a property in the designer
- Download and upload using CSV format
  - Not TSV!
  - Not Excel!
<table>
<thead>
<tr>
<th>Variable / Field</th>
<th>Form Name</th>
<th>Section Header</th>
<th>Field Type</th>
<th>Field Label</th>
<th>Choices, Calc</th>
<th>Field Note</th>
<th>Text Validation</th>
<th>Text Validation</th>
<th>Text Validation</th>
</tr>
</thead>
<tbody>
<tr>
<td>record_id</td>
<td>demographics</td>
<td></td>
<td>text</td>
<td>Subject Id</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>dem_firstname</td>
<td>demographics</td>
<td></td>
<td>text</td>
<td>First Name</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>dem_lastname</td>
<td>demographics</td>
<td></td>
<td>text</td>
<td>Last Name</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>dem_gender</td>
<td>demographics</td>
<td></td>
<td>radio</td>
<td>Gender</td>
<td>1, female</td>
<td>2, male</td>
<td>3, prefer not to answer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>dem_dob</td>
<td>demographics</td>
<td></td>
<td>text</td>
<td>Birthdate</td>
<td>date_mdy</td>
<td>1/1/60</td>
<td>1/1/85</td>
<td></td>
<td></td>
</tr>
<tr>
<td>dem_thankyou</td>
<td>demographics</td>
<td></td>
<td>descriptive</td>
<td>Thank you, [dem_firstname], for you time in completing this form!</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>happy1_align</td>
<td>alignment</td>
<td></td>
<td>yesno</td>
<td>Are you happy?</td>
<td>RV</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>hungry1_align</td>
<td>alignment</td>
<td></td>
<td>yesno</td>
<td>Are you hungry?</td>
<td>RH</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>thirsty1_align</td>
<td>alignment</td>
<td></td>
<td>yesno</td>
<td>Are you thirsty?</td>
<td>LV</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>angry1_align</td>
<td>alignment</td>
<td></td>
<td>yesno</td>
<td>Are you angry?</td>
<td>LH</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>demo_firstname</td>
<td>validation</td>
<td></td>
<td>text</td>
<td>First Name</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>demo_lastname</td>
<td>validation</td>
<td></td>
<td>text</td>
<td>Last name</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>demo_gender</td>
<td>validation</td>
<td></td>
<td>radio</td>
<td>Gender</td>
<td>1, female</td>
<td>2, male</td>
<td>3, prefer not to answer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>birthdate</td>
<td>validation</td>
<td></td>
<td>radio</td>
<td>Birthdate (gi/go)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>age</td>
<td>validation</td>
<td></td>
<td>text</td>
<td>Age</td>
<td></td>
<td>Enter an integer</td>
<td>18</td>
<td>65</td>
<td></td>
</tr>
<tr>
<td>email</td>
<td>validation</td>
<td></td>
<td>text</td>
<td>Email</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>mobile_phone</td>
<td>validation</td>
<td></td>
<td>text</td>
<td>Mobile phone</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>bmi_weight</td>
<td>bmi</td>
<td></td>
<td>text</td>
<td>Weight (in pounds)</td>
<td>number</td>
<td>50</td>
<td>300</td>
<td></td>
<td></td>
</tr>
<tr>
<td>bmi_height</td>
<td>bmi</td>
<td></td>
<td>text</td>
<td>Height (in inches)</td>
<td>number</td>
<td>48</td>
<td>200</td>
<td></td>
<td></td>
</tr>
<tr>
<td>bmi_bmi</td>
<td>bmi</td>
<td></td>
<td>calc</td>
<td>BMI</td>
<td></td>
<td>$((bmi_weight)/(bmi_height)^2)*703</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>bmi_bmi2</td>
<td>bmi</td>
<td></td>
<td>calc</td>
<td>BMI</td>
<td></td>
<td>round($((bmi_bmi)/With rounding to 1 decimal place)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>bmi_bmi3</td>
<td>bmi</td>
<td></td>
<td>calc</td>
<td>BMI</td>
<td></td>
<td>round($((bmi_bmi)/With rounding to 1 decimal place)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>race</td>
<td>checkbox branching</td>
<td></td>
<td>checkbox</td>
<td>Race</td>
<td></td>
<td>White, White (A person having origins in any of the original people)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>other</td>
<td>checkbox branching</td>
<td></td>
<td>text</td>
<td>Other race</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Data Dictionary (2 of 2)

<table>
<thead>
<tr>
<th>K</th>
<th>L</th>
<th>M</th>
<th>N</th>
<th>O</th>
<th>P</th>
<th>Q</th>
<th>R</th>
<th>S</th>
</tr>
</thead>
<tbody>
<tr>
<td>Y</td>
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<td>RH</td>
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<tr>
<td>Y</td>
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<td>Y</td>
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<td></td>
<td></td>
<td>LV</td>
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<td>Y</td>
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<td></td>
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<td>Y</td>
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<td>RH</td>
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<tr>
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<td></td>
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<td></td>
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<tr>
<td>Y</td>
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<td>Y</td>
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<td></td>
</tr>
</tbody>
</table>
Data Dictionary

- Uploading Changes
  - REDCap will list out any errors and/or warnings before you can commit your changes
  - Don't forget to click **Commit Changes**
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Codebook & PDFs

- Codebook

- PDFs of forms (with or without data)
  - Open form (in data collection mode)
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Development & Production Modes

• On Project Home screen

![Project Dashboard](image)

- You can do anything in Development mode
Development & Production Modes

- Once in Production Mode
  - Click on Online Designer from Project Setup tab

- Changes will be held in draft mode and need to be **submitted & approved** before going live (production)
- CDS approves all production changes (except for automatically approved ones)!
  - This is for your data safety!

This topic discussed in much greater detail in RC 302 class
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More Information

• Visit http://redcap.fredhutch.org (Fred Hutch instance)
• Or email redcap@fredhutch.org

• Also...
  • http://project-redcap.org (Vanderbilt REDCap site)
Thank you!

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