

REDCap and DDI


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REDCap Consortium

<http://project-redcap.org/>



Consortium Wiki (Login Required)

Upcoming Events:

- Weekly All-Hands Consortium Meeting - Every Friday, 1-2PM Central

Introduction Software Consortium Partners Become a Partner Video Resources Citing REDCap Library


The REDCap Consortium is composed of **509 active institutional partners** from CTSA, GCRC, RCMI and other institutions in **48 countries**. The consortium supports a secure web application (REDCap) designed exclusively to support data capture for research studies.

The REDCap application allows users to build and manage online surveys and databases quickly and securely, and is currently in production use or development build-status for more than **51,600 projects** with over **68,900 users** spanning numerous research focus areas across the consortium. To find out if your institution is already running REDCap, you will find contact information on the [Consortium Partners](#) page. Learn more about REDCap by watching a [brief summary video \(4 min\)](#).

Map of REDCap Consortium Partners

[View fullscreen map](#)

Map Satellite Hybrid



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[Terms of Use](#)

Recent research studies citing REDCap:

Procurement of Shared Data Instruments for Research Electronic Data Capture (REDCap) *J Biomed Inform.* 2012 Nov 10. pii: S1532-0464(12)00160-8. doi: 10.1016/j.jbi.2012.10.006. [Epub ahead of print].

Unplanned cigarette purchases and tobacco point of sale advertising: a potential barrier to smoking cessation *Tob Control.* 2012 Nov 8. [Epub ahead of print].

Prevalence, Incidence, and Classification of Chronic Fatigue Syndrome in Olmsted County, Minnesota, as Estimated Using the Rochester Epidemiology Project *Mayo Clin Proc.* 2012 Nov 7. pii: S0025-6196(12)00923-8. doi: 10.1016/j.mayocp.2012.08.015. [Epub ahead of print].

Survey of Hand Surgeons Regarding Their Perceived Needs for an Expanded Upper Extremity Fellowship *J Hand Surg Am.* 2012 Nov;37(11):2374-2380.e3. doi: 10.1016/j.jhnsa.2012.08.013.

Weekly Calendar Planning Activity (WCPA): A Performance-Based Assessment of Executive Function Plotted With At-Risk Adolescents *Am J Occup Ther.* 2012 Nov;66(6):699-708. doi: 10.5014/ajot.2012.004754.

Comprehensive Knowledge of HIV among Women in Rural Mozambique: Development and Validation of the HIV Knowledge 27 Scale *PLoS One.* 2012;7(10):e48676. doi: 10.1371/journal.pone.0048676. Epub 2012 Oct 31.

[View all 160 articles](#)

REDCap Citation



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[Introduction](#)

[Software](#)

[Consortium Partners](#)

[Become a Partner](#)

[Video Resources](#)

[Citing REDCap](#)

[Library](#)

Citing REDCap

Please cite the publication below in study manuscripts using REDCap for data collection and management. We recommend the following boilerplate language:

Study data were collected and managed using REDCap electronic data capture tools hosted at [YOUR INSTITUTION].¹ REDCap (Research Electronic Data Capture) is a secure, **web-based application** designed to support data capture for research studies, providing: 1) **an intuitive interface** for validated data entry; 2) **audit trails** for tracking data manipulation and export procedures; 3) automated **export procedures** for seamless data downloads to common statistical packages; and 4) procedures for **importing data** from external sources.

¹Paul A. Harris, Robert Taylor, Robert Thielke, Jonathon Payne, Nathaniel Gonzalez, Jose G. Conde, Research electronic data capture (REDCap) - A metadata-driven methodology and workflow process for providing translational research informatics support, J Biomed Inform. 2009 Apr;42(2):377-81.

Link to article: <http://www.sciencedirect.com/science/article/pii/S1532046408001226>

Application

Interface

Audit Trails


Export and import

REDCap as an Environment

- Secure
- Web based
- Build and manage online surveys and databases
 - Online Designer
 - Excel template file
- Exports to SPSS, SAS, Stata, and R
- Project management features
 - Calendar, scheduling, reporting, triggers, longitudinal studies, rights and permissions

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Welcome to REDCap!

REDCap is a secure, web-based application for building and managing online surveys and databases. Using REDCap's stream-lined process for rapidly developing projects, you may 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 be later 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 watching 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.

NOTICE: If you are collecting data for the purposes of human subjects research, review and approval of the project is required by your Institutional Review Board.

If you require assistance or have any questions about REDCap, please contact [Todd Little, PhD](#).

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.

Scheduling - Utilize a built-in project calendar and scheduling module for organizing your events and appointments.


Easily manage a contact list of survey respondents or create a simple survey link - Build a list of email contacts, create custom email invitations, and track who responds, or you may also create a single survey link to email out or post on a website.


Send files to others securely - Using 'Send-It', upload and send files to multiple recipients, including existing project documents, that are too large for email attachments or that contain sensitive data


Online Designer – Project Setup


The University of Kansas
Center for Research Methods and Data Analysis


My Example Survey For DDI


 Project Home


 Project Setup

 Other Functionality

 Project Revision History

Project status:  Development

 [VIDEO: How to create and manage a survey in REDCap](#)
Completed steps **0** of **7**




Not started

I'm done!

Modify project settings or make customizations

You have created your project and are ready to begin building on it. If you would like to modify the general project settings that you set when creating the project or if you wish to make some customizations to the project (e.g. enable auto-numbering for new records), use the buttons below.

Go to Modify project settings or Make customizations




In progress

I'm done!


Set up my survey

Set up your survey by providing basic information about the survey (e.g. survey title, instructions, settings). Once the survey is set up, you may return any time to modify the survey settings.

Go to Modify survey settings or Preview survey or Download survey as PDF

 **Survey is currently active** Take survey offline

The survey title is **My Example Survey**



In progress

I'm done!

Design your survey questions

Add or edit questions for your survey. This may be done by either using the Online Designer (online method) or by uploading a Data Dictionary (offline method), in which you may use either method or both. Quick links: [Download PDF of all data collection instruments](#) OR [Download the current Data Dictionary](#)

Go to Online Designer or Upload Data Dictionary

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

Project Setup (continued)



Optional

I'm done!

Set up project bookmarks (optional)

You may create custom bookmarks to webpages that exist inside or outside of REDCap. These bookmarks will be seen as links on the left-hand project menu and can be accessed at any time by users who are given privileges to do so. Every project bookmark has custom settings that allow one to control its appearance and behavior.

Go to [Add or edit bookmarks](#)



Not started

I'm done!

Triggers & Notifications (optional)

Set up triggers and notifications for your survey. Currently, you may set your survey to notify you via email when any participant completes it. In the future, other kinds of triggers and notifications will become available for use.

Go to [Triggers & Notifications](#)



Optional

I'm done!

User Rights and Permissions

You may grant other users access to this project or edit the user privileges of current users on this project by navigating to the User Rights page.

Go to [User Rights](#)



Not started



Move your project to production status

Move the project to production status so that real data may be collected. Once in production, you will not be able to edit the project fields in real time anymore. However, you can make edits in Draft Mode, which will then need to be approved by a REDCap administrator before taking effect.






Go to [Move project to production](#)

Online Designer – Question Sequence

[Add Question](#) [Add Matrix of Questions](#)

  **Section 1** (This is a section header with descriptive text. It only provides informational text and is used to divide the survey into sections for organization. If the survey is set to be displayed as "one section per page", then these section headers will begin each new page of the survey.)







[Add Question](#) [Add Matrix of Questions](#)

     Variable: textbox

This is a TEXT BOX, which allows respondents to enter a small amount of text. A Text Box can be validated, if needed, as a number, integer, phone number, email, or zipcode. If validated as a number or integer, you may also set the minimum and/or maximum allowable values.

This question has "number" validation set with a minimum of 1 and a maximum of 10.
It is tagged as Question Number 3

[Add Question](#) [Add Matrix of Questions](#)







      Variable: radio2_edf

You may create MULTIPLE CHOICE questions and set the answer choices for them. You can have as many answer choices as you need. This multiple choice question is rendered as RADIO buttons.

☐ Choice One
☐ Choice Two
☐ Choice Three
☐ Choice Four

[reset](#)

[Add Question](#) [Add Matrix of Questions](#)

      Variable: radio2_edf2_1f8


You may create MULTIPLE CHOICE questions and set the answer choices for them. You can have as many answer choices as you need. This multiple choice question is rendered as RADIO buttons.

☐ Choice One
☐ Choice Two
☐ Choice Three
☐ Choice Four

[reset](#)

Individual Question

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 \(5 min\)](#).

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

Question Number (optional)
Displayed only on the survey page

Field Label

You may create MULTIPLE CHOICE questions and set the answer choices for them. You can have as many answer choices as you need. This multiple choice question is rendered as RADIO buttons.

Choices (one choice per line)

1, Choice One
2, Choice Two
3, Choice Three
4, Choice Four

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

Variable Name (utilized during data export)

ONLY letters, numbers, and underscores


☐ **Enable auto naming of variable based upon its Field Label?**

Required?* ☒ No ☐ Yes
* Prompt if field is blank

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


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

Field Note (optional)
Small reminder text displayed underneath field

Looking for Branching Logic? Try clicking the  icon for this field after clicking the Save or Cancel button below.

Save **Cancel**

Field Types

Multiple Choice - Radio Buttons (Single Answer) 

--- Select a Type of Field ---

Text Box (Short Text)

Notes Box (Paragraph Text)

Calculated Field

Multiple Choice - Drop-down List (Single Answer)

Multiple Choice - Radio Buttons (Single Answer)

Checkboxes (Multiple Answers)

Yes - No

True - False

Slider / Visual Analog Scale






File Upload (for users to upload files)

Descriptive Text (with optional Image/File Attachment)

Begin New Section (with optional text)

ADD NEW FIELD

Branching

     Variable: hidden_branch [Branching logic exists]

HIDDEN QUESTION: This question will only appear when you select the second option of the question immediately above.

A Field Note for a hidden question

[Add Question](#) [Add Matrix of Questions](#)

Choose method below for the following field: **hidden_branch** - *HIDDEN QUESTION: This question will only appe...*

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



Show the field ONLY if...

[radio_branch] = "2"

[Clear logic](#)

☒ **Drag-N-Drop Logic Builder**

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

participant_id = (define criteria) 
textbox = (define criteria) 
radio2_edf = Choice One (1)
radio2_edf = Choice Two (2)
radio2_edf = Choice Three (3)
radio2_edf = Choice Four (4)
radio2_edf2_1f8 = Choice One (1)
radio2_edf2_1f8 = Choice Two (2)
radio2_edf2_1f8 = Choice Three (3)




Drag
and
Drop



Show the field ONLY if...

☒ ALL below are true

☐ ANY below are true

radio_branch = Clicking this option will trigger the branching logic... (2) 

[Clear logic](#)

A REDCap survey description can be exported to a csv file. An R program reads the csv and writes a DDI 3.1 file.

REDCAP TO DDI

One Row, CSV File (Excel Template)

- Variable / Field Name
- Form Name
- Section Header
- Field Type
- Field Label
- Choices, Calculations, OR Slider Labels
- Field Note
- Text Validation Type OR Show Slider Number
- Text Validation Min
- Text Validation Max
- Identifier?
- Branching Logic (Show field only if...)
- Required Field?
- Custom Alignment
- Question Number (surveys only)
- Matrix Group Name

TASK

From:

One row per question
(with Header and Note)

To:

Hierarchical DDI
structure

Example: text field containing a number

CSV Column Name	CSV value
Variable / Field Name	textbox
Form Name	survey
Section Header	Section 1 (This is a section header with descriptive text. It only provides informational text and is used to divide the survey into sections for organization. If the survey is set to be displayed as "one section per page", then these section headers will begin each new page of the survey.)
Field Type	text
Field Label	<p>This is a TEXT BOX, which allows respondents to enter a small amount of text. A Text Box can be validated, if needed, as a number, integer, phone number, email, or zipcode. If validated as a number or integer, you may also set the minimum and/or maximum allowable values.</p> <p>This question has "number" validation set with a minimum of 1 and a maximum of 10.</p> <p>It is tagged as Question Number 3</p>
Choices, Calculations, OR Slider Labels	
Field Note	
Text Validation Type OR Show Slider Number	number
Text Validation Min	1
Text Validation Max	10
Identifier?	
Branching Logic (Show field only if...)	
Required Field?	
Custom Alignment	
Question Number (surveys only)	
Matrix Group Name	

Field Type: **text**

Text Validation
Type OR Show
Slider Number:
number

Extrema

Example: text field containing a number

Field Type	Field Label	Choices, Calculations, OR SII Field Note	Text Validation Type OR Show Slider Number	Text Validation Min	Text Validation Max
	This is a TEXT BOX, which allows respondents to enter a small amount of text. A Text Box can be validated, if needed, as a number, integer, phone number, email, or zipcode. If validated as a number or integer, you may also set the minimum and/or maximum allowable values.				
	This question has "number" validation set with a minimum of 1 and a maximum of 10.				
text	It is tagged as Question Number 3		number	1	10

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 \(5 min\)](#).

Field Type: Text Box (Short Text) ▼

Question Number (optional) 3
Displayed only on the survey page

Field Label

This is a TEXT BOX, which allows respondents to enter a small amount of text. A Text Box can be validated, if needed, as a number, integer, phone number, email, or zipcode. If validated as a number or integer, you may also set the minimum and/or maximum allowable values.

This question has "number" validation set with a

Variable Name (utilized during data export)

textbox

ONLY letters, numbers, and underscores

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

Validation? (optional)

Number ▼

Minimum: 1

Maximum: 10

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

DDI – Question w/ Numeric Domain

Field Type	Field Label	Choices, Calculations, OR SII Field Note	Text Validation Type OR Show Slider Number	Text Validation Min	Text Validation Max
	<p>This is a TEXT BOX, which allows respondents to enter a small amount of text. A Text Box can be validated, if needed, as a number, integer, phone number, email, or zipcode. If validated as a number or integer, you may also set the minimum and/or maximum allowable values.</p>				
	<p>This question has "number" validation set with a minimum of 1 and a maximum of 10.</p>				
text	It is tagged as Question Number 3		number	1	10

```

<d:QuestionItem id="525CE623-5CF6-4E99-AF5B-807FCD0DB13F" version="1.0.0">
  <d:QuestionItemName>textbox</d:QuestionItemName>
  <d:QuestionText>
  </d:QuestionText>
  <d:NumericDomain type="Double">
    <r:NumberRange>
      <r:Low>1</r:Low>
      <r:High>10</r:High>
    </r:NumberRange>
    <r:Description>REDCap Field Type:  text  .</r:Description>
  </d:NumericDomain>
</d:QuestionItem>
  
```


Section Header – in same row as data field


Variable / Field Name	Form Name	Section Header	Field Type	Field Name
		Section 1 (This is a section header with descriptive text. It only provides informational text and is used to divide the survey into sections for organization. If the survey is set to be displayed as "one section per page", then these section headers will begin each new page of the survey.)	text	It
textbox	survey			

```
<d:StatementItem id="467E8690-9399-4CFA-9528-288CF89AF310" version="1.0.0">
  <d:ConstructName>SectionHeaderForQuestion1</d:ConstructName>
  <r:Label>Section Header preceding question: 1 , textbox</r:Label>
  <d:DisplayText>
    <d:LiteralText>
      <d:Text>Section 1 (This is a section header with descriptive text. It only
    </d:LiteralText>
  </d:DisplayText>
</d:StatementItem>
```

Example: coded variable w/ radio buttons

Field Type	Field Label	Choices, Calculations, OR Sli Field Note
radio	You may create MULTIPLE CHOICE questions and set the answer choices for them. You can have as many answer choices as you need. This multiple choice question is rendered as RADIO buttons.	1, Choice One 2, Choice Two 3, Choice Three 4, Choice Four

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 \(5 min\)](#).

Field Type:

Question Number (optional)

Displayed only on the survey page

Field Label

You may create MULTIPLE CHOICE questions and set the answer choices for them. You can have as many answer choices as you need. This multiple choice question is rendered as RADIO buttons.

Choices (one choice per line)

1, Choice One
2, Choice Two
3, Choice Three
4, Choice Four

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

Variable Name (utilized during data export)

ONLY letters, numbers, and underscores

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

Required?* ☒ No ☐ Yes

* Prompt if field is blank

Identifier? ☒ No ☐ Yes


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

Custom Alignment

Align the position of the field on the page

Field Note (optional)

Small reminder text displayed underneath field

Looking for Branching Logic? Try clicking the  icon for this field after clicking the Save or Cancel button below.

REDCap Code and Category Strings Repeat

Field Type	Field Label	Choices, Calculations, OR Sli Field Note
radio	You may create MULTIPLE CHOICE questions and set the answer choices for them. You can have as many answer choices as you need. This multiple choice question is rendered as RADIO buttons.	1, Choice One 2, Choice Two 3, Choice Three 4, Choice Four
radio	You may create MULTIPLE CHOICE questions and set the answer choices for them. You can have as many answer choices as you need. This multiple choice question is rendered as RADIO buttons.	1, Choice One 2, Choice Two 3, Choice Three 4, Choice Four

```
</l:CategoryScheme>
<l:CategoryScheme id="7723A911-9A92-4C27-80BD-295D10B2DE35" version="1.0.0" ag
<l:CategorySchemeName>CatScheme3</l:CategorySchemeName>
<l:Category id="32F3F66F-836B-4594-8C3B-10A034104AB1" version="1.0.0">
  <r:Label>Choice One </r:Label>
</l:Category>
<l:Category id="0FCAA8C9-A448-4C8B-BA26-4F526A5A9AD8" ve
  <r:Label>Choice Two </r:Label>
</l:Category>
<l:Category id="EB152730-D18D-4660-BECF-6EAEFF2B41FD" ve
  <r:Label>Choice Three </r:Label>
</l:Category>
<l:Category id="CD5239C6-B3B1-49A0-B660-DCB0D19853EF" ve
  <r:Label>Choice Four</r:Label>
</l:Category>
</l:CategoryScheme>
```

```
<l:CodeScheme id="FCCD19BC-726D-454E-9D01-6D9178838905" ver
<l:CodeSchemeName>CodeScheme3</l:CodeSchemeName>
<l:CategorySchemeReference>
  <r:ID>7723A911-9A92-4C27-80BD-295D10B2DE35</r:ID>
  <r:IdentifyingAgency>example.org</r:IdentifyingAgency>
  <r:Version>1.0.0</r:Version>
</l:CategorySchemeReference>
<l:Code>
  <l:CategoryReference>
    <r:Scheme>
      <r:ID>7723A911-9A92-4C27-80BD-295D10B2DE35</r:ID>
      <r:IdentifyingAgency>example.org</r:IdentifyingAgency>
      <r:Version>1.0.0</r:Version>
    </r:Scheme>
    <r:ID>32F3F66F-836B-4594-8C3B-10A034104AB1</r:ID>
    <r:IdentifyingAgency>example.org</r:IdentifyingAgency>
    <r:Version>1.0.0</r:Version>
  </l:CategoryReference>
  <l:Value>1</l:Value>
</l:Code>
```

In DDI, only one Code and Category Scheme to be used by reference

Lots of References

```
<d:QuestionItem id="00776E9E-8DC0-4A21-BFEC-ADA427EB18C1" version="1.0.0">
  <d:QuestionItemName>radio2_edf</d:QuestionItemName>
  <d:QuestionText>
    <d:LiteralText>
      <d:Text>You may create MULTIPLE CHOICE questions and set the answer choic
    </d:LiteralText>
    </d:QuestionText>
    <d:CodeDomain classificationLevel="Nominal">
      <r:CodeSchemeReference>
        <r:ID>FCCD19BC-726D-454E-9D01-6D9178838905</r:ID>
        <r:IdentifyingAgency>example.org</r:IdentifyingAgency>
        <r:Version>1.0.0</r:Version>
      </r:CodeSchemeReference>
      <r:Description>REDCap Field Type: radio .</r:Description>
    </d:CodeDomain>
  </d:QuestionItem>
```

CodeScheme references CategoryScheme

```
</l:CategoryScheme>
<l:CategoryScheme id="7723A911-9A92-4C27-80BD-295D10B2DE35" version="1.0.0">
  <l:CategorySchemeName>CatScheme3</l:CategorySchemeName>
  <l:Category id="32F3F66F-836B-4594-8C3B-10A034104AB1" version="1.0.0">
    <r:Label>Choice One</r:Label>
  </l:Category>
  <l:Category id="0FCAA8C9-A448-4C8B-BA26-4F526A5A9AD8" version="1.0.0">
    <r:Label>Choice Two</r:Label>
  </l:Category>
  <l:Category id="EB152730-D18D-4660-BECF-6EAEFF2B41FD" version="1.0.0">
    <r:Label>Choice Three</r:Label>
  </l:Category>
  <l:Category id="CD5239C6-B3B1-49A0-B660-DCB0D19853EF" version="1.0.0">
    <r:Label>Choice Four</r:Label>
  </l:Category>
</l:CategoryScheme>
```

```
<l:CodeScheme id="FCCD19BC-726D-454E-9D01-6D9178838905" version="1.0.0">
  <l:CodeSchemeName>CodeScheme3</l:CodeSchemeName>
  <l:CategorySchemeReference>
    <r:ID>7723A911-9A92-4C27-80BD-295D10B2DE35</r:ID>
    <r:IdentifyingAgency>example.org</r:IdentifyingAgency>
    <r:Version>1.0.0</r:Version>
  </l:CategorySchemeReference>
  <l:Code>
    <l:CategoryReference>
      <r:Scheme>
        <r:ID>7723A911-9A92-4C27-80BD-295D10B2DE35</r:ID>
        <r:IdentifyingAgency>example.org</r:IdentifyingAgency>
        <r:Version>1.0.0</r:Version>
      </r:Scheme>
      <r:ID>32F3F66F-836B-4594-8C3B-10A034104AB1</r:ID>
      <r:IdentifyingAgency>example.org</r:IdentifyingAgency>
      <r:Version>1.0.0</r:Version>
    </l:CategoryReference>
    <l:Value>1</l:Value>
  </l:Code>
```

Note: the program generates random style UUIDs

DateTime fields

Field Label	Choices, Calculations, OR Sli	Field Note	Text Validation Type OR Show Slider Number
DATE questions are also an option. If you click the calendar icon on the right, a pop-up calendar will appear, thus allowing the respondent to easily select a date. Or it can be simply			date_ymd
DATETIME: This Datetime field is required and has a minimum and maximum		A note to point out that this is required	datetime_ymd
TIME: a time field			time

Text Validation Type OR Show Slider Number: **date_ymd**

```
<d:QuestionItem id="ED0ACBE7-8FC5-4907-8C90-61B6C2CE7CEA" version="1.0.0">
  <d:QuestionItemName>date</d:QuestionItemName>
  <d:QuestionText>
    <d:LiteralText>
      <d:Text>DATE questions are also an option. If you click the calendar icon
    </d:Text>
    </d:LiteralText>
  </d:QuestionText>
  <d:DateTimeDomain type="Date" format="ymd">
    <r:Description>REDCap Field Type: text .</r:Description>
  </d:DateTimeDomain>
</d:QuestionItem>
```

Sliders

A SLIDER is a question type that allows the respondent to choose an answer along a continuum. The respondent's answer is saved as an integer between 0 (far left) and 100 (far right) with a step of 1.

You can provide labels above the slider

Middle label

Right-hand label



Click bar above and then drag to set response

- Return a value between 0 and 100
- End and mid points labeled
- Optionally display the numeric value
- How to represent?
 - Numeric ?
 - Categories for some values (0, 50 , 100)?
 - Recorded in the NumericDomain Description

Slider as Numeric question/variable

A SLIDER is a question type that allows the respondent to choose an answer along a continuum. The respondent's answer is saved as an integer between 0 (far left) and 100 (far right) with a step of 1.

You can provide labels above the slider

Middle label

Right-hand label



Click bar above and then drag to set response

```
</d:QuestionItem>
<d:QuestionItem id="97C40F2C-B7DA-4388-AC42-54CCB513D5A0" version="1.0.0">
  <d:QuestionItemName>slider</d:QuestionItemName>
  <d:QuestionText>
    <d:LiteralText>
      <d:Text>A SLIDER is a question type that allows the respondent to choose an
    </d:LiteralText>
    </d:QuestionText>
    <d:NumericDomain type="Integer">
      <r:NumberRange>
        <r:Low>0</r:Low>
        <r:High>100</r:High>
      </r:NumberRange>
      <r:Description>REDCap Field Type: slider . NOTE: This question has a min:
    </d:NumericDomain>
  </d:QuestionItem>
```

This Description added to the NumericDomain

REDCap Field Type: slider .

NOTE: This question has a minimum of 0 and a maximum of 100.

The end and middle points were labeled as:

0, You can provide labels above the slider | 50, Middle label | 100, Right-hand label

Could be Slider as Coded variable

A SLIDER is a question type that allows the respondent to choose an answer along a continuum. The respondent's answer is saved as an integer between 0 (far left) and 100 (far right) with a step of 1.

You can provide labels above the slider

Middle label

Right-hand label



Click bar above and then drag to set response

```
<d:QuestionItem id="55930335-0902-4739-9506-CAD738709E41" version="1.0.0">
  <d:QuestionItemName>slider</d:QuestionItemName>
  <d:QuestionText>
    <d:LiteralText>
      <d:Text>A SLIDER is a question type that allows the respondent to choose an answer
    </d:LiteralText>
  </d:QuestionText>
  <d:CodeDomain classificationLevel="Nominal">
    <r:CodeSchemeReference>
      <r:ID>757C6819-5850-4AE3-BACC-364790D08935</r:ID>
      <r:IdentifyingAgency>example.org</r:IdentifyingAgency>
      <r:Version>1.0.0</r:Version>
    </r:CodeSchemeReference>
    <r:Description>REDCap Field Type: slider . NOTE: The REDCap slider field returns
  </d:CodeDomain>
</d:QuestionItem>
```

This Description added to the CodeDomain

REDCap Field Type: slider .

NOTE: The REDCap slider field returns a numeric value between 0 and 100, but may have labels for the end and mid points.

CSV values for a conditional question

CSV Column Name	CSV value
Variable / Field Name	hidden_branch
Form Name	survey
Section Header	Section Header immediately before question hidden_branch
Field Type	text
Field Label	HIDDEN QUESTION: This question will only appear when you select the second option of the question immediately above.
Choices, Calculations, OR Slider Labels	
Field Note	A Field Note for a hidden question
Text Validation Type OR Show Slider Number	
Text Validation Min	undefined
Text Validation Max	undefined
Identifier?	
Branching Logic (Show field only if...)	[radio_branch] = "2"
Required Field?	
Custom Alignment	
Question Number (surveys only)	
Matrix Group Name	

The header and note will also be displayed conditionally

The Question and surrounding text will appear when this REDCap expression is true

Branching Logic (Show field only if...) **[radio_branch] = "2"**

hidden_branch,survey,"Section Header immediately before question hidden_branch ",text,"HIDDEN QUESTION: This question will only appear when you select the second option of the question immediately above.",,"A Field Note for a hidden question",,undefined,undefined,, "[radio_branch] = ""2""",,,

ControlConstruct chain to build the Instrument

CSV Column Name	CSV value
Variable / Field Name	hidden_branch
Form Name	survey
Section Header	Section Header immediately before question hidden_branch
Field Type	text
Field Label	HIDDEN QUESTION: This question will only appear when you select the second option of the question immediately above.
Choices, Calculations, OR Slider Labels	
Field Note	A Field Note for a hidden question
Text Validation Type OR Show Slider Number	
Text Validation Min	undefined
Text Validation Max	undefined
Identifier?	
Branching Logic (Show field only if...)	[radio_branch] = "2"
Required Field?	
Custom Alignment	
Question Number (surveys only)	
Matrix Group Name	

DDI d:StatementItem

DDI d:StatementItem

DDI d:QuestionConstruct

DDI d:Sequence

DDI d:IfThenElse

DDI d:Sequence
(master sequence)

DDI d:Instrument

```
<d:Instrument id="52B1FE0E-094F-437A-96AC-778CC7C3DD2E" version="1.0.0" age:
<d:InstrumentName>REDCap Questionnaire</d:InstrumentName>
<r:Software id="2234B4FA-D1EE-4BEE-A051-C05FF9897F91">
  <r:Name>REDCap Survey Questionnaire</r:Name>
  <r:Name>????</r:Name>
  <r:Name>REDCap Online Survey Questionnaire designer</r:Name>
</r:Software>
<d:ControlConstructReference>
  <r:Scheme>
    <r:ID>3ED16C54-7799-4597-9C23-82B73E6B30DD</r:ID>
    <r:IdentifyingAgency>example.org</r:IdentifyingAgency>
    <r:Version>1.0.0</r:Version>
  </r:Scheme>
  <r:ID>895C3AA6-5EBE-4B05-AACD-3E45DEA56060</r:ID>
  <r:IdentifyingAgency>example.org</r:IdentifyingAgency>
  <r:Version>1.0.0</r:Version>
</d:ControlConstructReference>
</d:Instrument>
```

More complex Instrument issues

- REDCap can set an option that ends the session upon entry of a particular value (a "stop action")
 - This could be represented with IfThenElse of a Sequence
 - Not done in this version
- REDCap has a Matrix Group construct
 - This is partly a layout issue but could be better documented with a sub-sequence than in this version of the program

Going the other way – defining a REDCap survey by transforming a DDI 3.1 file to a REDCap csv template.

DDI TO REDCAP

Hierarchical DDI to one row per Question

- REDCap uses Code/Category schemes by repetition instead of by reference
- DDI Instruments may be much more complex than a simple sequence with a conditional display of a question.
 - Combining REDCap calculated fields with conditional display might allow Loop, RepeatUntil etc. function.
 - Parsing Instrument and ControlConstructs not done in this version.
 - E.g. no Section Headers or Field Notes

Hierarchical DDI to one row per Question

- URNs not evaluated
- Coded questions treated as "radio" fields.
- "checkbox" (multiple response)
 - multiple variables not generated
 - placed note in CodeDomain Description (not machine actionable)
 - treated as radio
- Calculated fields not generated
 - Could look for d:ComputationItem
 - Would require parsing arbitrary programming code and generating REDCap syntax

The metadata models for REDCap and DDI are not exactly the same.
Where do they not match up?

ISSUES

Issues

- Full DDI complexity not representable in REDCap
- REDCap co-mingles layout with content metadata dropdown, radio, slider, matrix, checkbox
- REDCap field type of “file” – file upload action
- REDCap CSV does not include project management features that it has (email triggers, scheduling).
- DDI 3.1 doesn't handle numeric variables with some labeled values well (like slider fields)

Issues

- REDCap allows minimum and maximum for DateTime types
- DDI allows multiple low, high pairs for numeric variables – REDCap has just one pair
- DDI 3.1 has no Description for a QuestionItem, no good place to put notes about display options
- REDCap can mark a Question as "required"
 - DDI RepeatUntil?
- REDCap can mark a Question as having personally identifiable information.

Issues

- ResourcePackage vs. Studyunit
 - Where do Questions, Variables, Categories, Codes go?
 - Used ResourcePackage (more compatible with Colectica, which I used for validation)

Future

- REDCap has an api – develop extensions that would work directly in REDCap?
 - Capture (and import?) project management level metadata?

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R DETAILS

Used R XML Package

- Used the R package "XML"
 - <http://cran.r-project.org/web/packages/XML/XML.pdf>
Author Duncan Temple Lang
Maintainer Duncan Temple Lang <duncan@r-project.org>
Title Tools for parsing and generating XML within R and S-Plus.
Depends R (>= 1.2.0), methods, utils

R tools, Redcap to DDI

- Used Hash Tree representation: xmlHashTree()
 - Allowed non-sequential addition to elements
- Fixed framework added first and then elements extended
 - CategorySchemes
 - CodeScheme
 - VariableSchemes
 - QuestionScheme
 - ControlConstructs and Instrument
- Hash table to find the index number of the code and category schemes

R tools, DDI to Redcap

- Used internal tree representation from reading DDI with `xmlTreeParse()`
- Built code and category string in REDCap format e.g.
1, bad, or worse | 2, good, or better
- Built a URN like string for complete category identifiers – used this as a hash key to the category value
- Did the same for CodeSchemes with the value being the REDCap code and category string