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Building upon REDCap – Extensibility based on the EM Framework: Use cases and the technology behind

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- Got a PhD in Biochemistry/Molecular Cell Biology (University of Vienna, 2003) and did basic research on the cytoskeletal protein *PLECTIN*.
- Founder/owner of a tiny IT company (SCI-Design.at, 2005).
- Moved to Germany (2010), heading the Research Lab of the Department of Obstetrics and Gynecology, Marien Hospital Herne, University Clinic of Ruhr-Universität Bochum.
- There, established REDCap (2015) after having had enough of crappy Excel sheets.
- Got (heavily) involved with the REDCap Consortium after a first REDCapCon (2019).
- Helped establishing the REDCap German User Group (2020), co-speaker since.
- During corona, got finally hooked on REDCap (everybody needs a hobby)
- REDCap Consortium MVP Award (2021)
- Winner of a REDCap All-Star Medal (2022)

- None
- But note that I may be heavily biased towards REDCap ;)
- ChatGPT may have helped in preparing these slides. It may have made some mistakes.
- This PDF is a modified version (animations removed)

- What is REDCap and High level overview of REDCap extensibility options
- The External Module (EM) Framework
- Comparison (EM Framework vs. Hooks vs. DET/API)
- External Modules Repository
- A few examples of EMs (and their fates)
- Writing EMs – Why and how (tools & resources)
- Deep dive into some EM Framework mechanics
- Caveats & What's missing?

An evil murderous fey

An Irish Redcap

A red-cap moustashed tamarin

(PDF: fun stuff removed)

Then it must be this?



REDCap
Research Electronic Data Capture



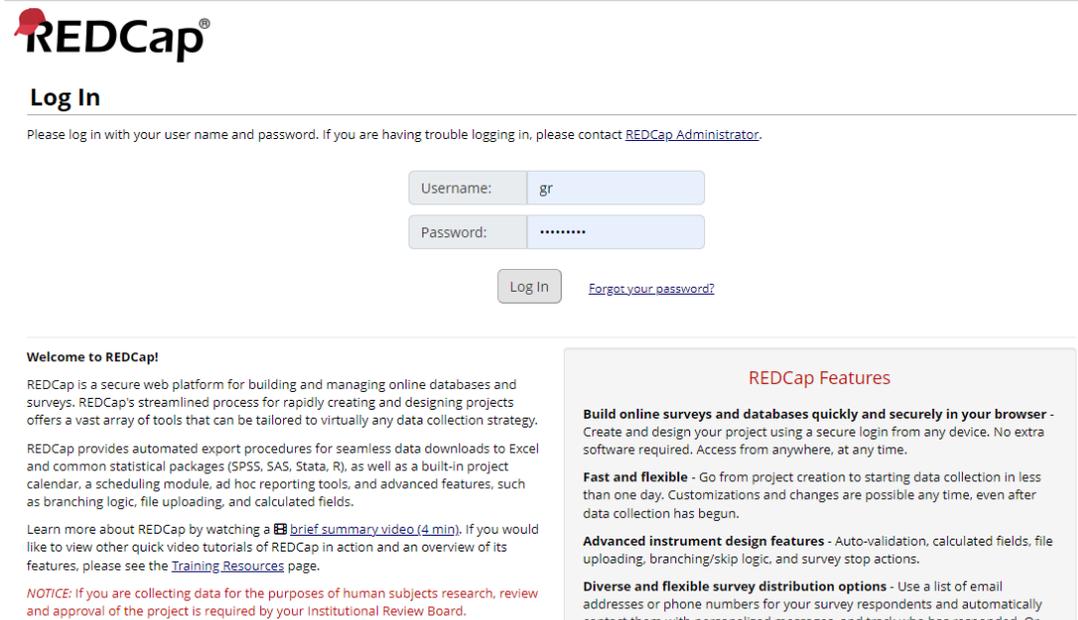
REDCap



In the realm of terms, a *comical* twist,
Redcap here, Red-cap there, it can't be missed!
A mushroom with a crimson cap in the mix,
And a research tool, REDCap, with **data** to assist,
Oh, the *curious world* of Redcaps, who'd have guessed?
Each one *unique*, leaving us all **impressed!**

REDCap – What is it?

- REDCap is a secure web-based application for collecting, managing, and analyzing research data.
- It offers user-friendly interfaces, customizable forms, data validation, collaboration features, and robust data privacy and security measures.
- It is widely used in various research disciplines globally.



The screenshot shows the REDCap login interface. At the top left is the REDCap logo. Below it is the text "Log In" and a note: "Please log in with your user name and password. If you are having trouble logging in, please contact [REDCap Administrator](#)." There are two input fields: "Username:" with the value "gr" and "Password:" with a masked password ".....". Below these fields are "Log In" and "Forgot your password?" buttons. The page content is divided into two columns. The left column has a "Welcome to REDCap!" heading followed by a paragraph describing REDCap as a secure web platform for building and managing online databases and surveys. It lists various features like automated export procedures, project calendar, and reporting tools. It also includes a link to a "brief summary video (4 min)" and a "Training Resources" page. A "NOTICE" at the bottom states that human subjects research requires IRB approval. The right column has a "REDCap Features" heading and lists three key features: "Build online surveys and databases quickly and securely in your browser", "Fast and flexible", and "Advanced instrument design features".

REDCap®

Log In

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

Username: gr

Password:

Log In [Forgot your password?](#)

Welcome to REDCap!

REDCap is a secure web platform for building and managing online databases and surveys. REDCap's streamlined process for rapidly creating and designing projects offers a vast array of tools that can be tailored to virtually any data collection strategy.

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.

REDCap Features

Build online surveys and databases quickly and securely in your browser - Create and design your project using a secure login from any device. No extra software required. Access from anywhere, at any time.

Fast and flexible - Go from project creation to starting data collection in less than one day. Customizations and changes are possible any time, even after data collection has begun.

Advanced instrument design features - Auto-validation, calculated fields, file uploading, branching/skip logic, and survey stop actions.

Diverse and flexible survey distribution options - Use a list of email addresses or phone numbers for your survey respondents and automatically outreach them with the appropriate survey or questionnaire.

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Advanced instrument design features - Auto-validation, calculated fields, file uploading, branching/skip logic, and survey stop actions.

Diverse and flexible survey distribution options - Use a list of email addresses or phone numbers for your survey respondents and automatically contact them with personalized messages, and track who has responded. Or create a simple link for an anonymous survey for mass email mailings, to post on a website, or print on a flyer.

Data quality - Use field validation, branching/skip logic, and Missing Data Codes to improve and protect data quality during data entry. Open data queries to automatically identify and resolve discrepancies and other issues real-time.

Custom reporting - Create custom searches for generating reports to view aggregate data. Identify trends with built-in basic statistics and charts.

Export data to common analysis packages - Export your data as a PDF or as CSV data for easy analysis in SAS, Stata, R, SPSS, or Microsoft Excel.

Secure file storage and sharing - Upload and share any type of file with anyone in the world through the File Repository feature or Send-It tool. Also works with exports and other built-in file uploading features.

Data-based triggers and alerts - Send real-time alerts and notifications to your team or other stakeholders via email, text, or phone based on certain data being entered or specific questions having a particular answer.

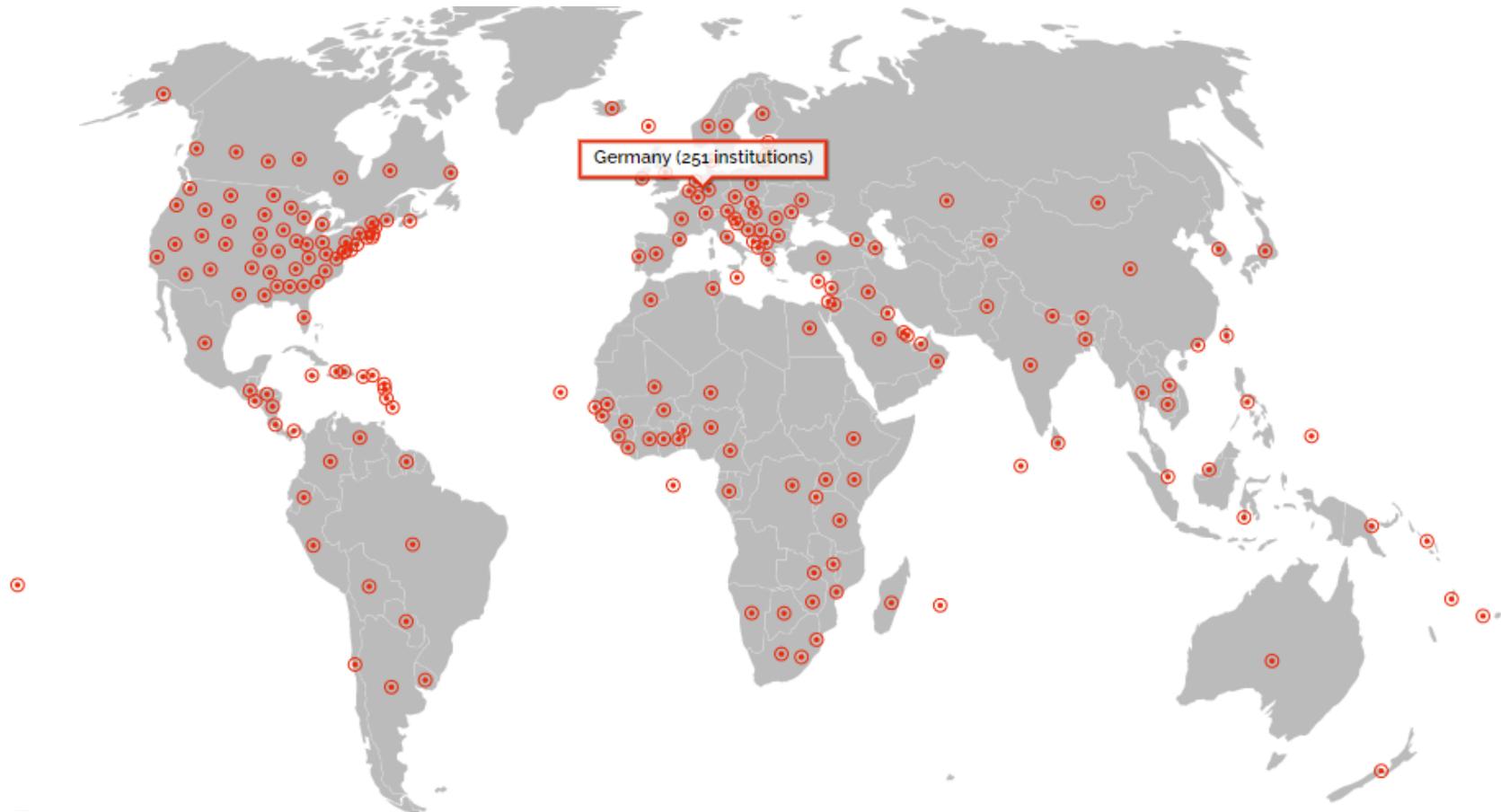
Connect to other resources - Use built-in features (API) to move data to/from your project. Build your own custom software development features to connect your project to other systems.

REDCap – Who uses it?

The REDCap Consortium has **6,377** active partners in **151** countries.

REDCap software has generated over **1,703,000** projects from over **2,439,000** users.

23,451 journal articles cite REDCap.



REDCap in Germany / German User Group

- Founded in 2020 Under the patronage / with the support of 
- German-speaking REDCap community with > 170 members
- Co-spokesperson since the founding meeting: Dr. Günther Rezniczek
Regular online and in-person meetings

Wahl der Sprecher der deutschen REDCap User Group für eine Bündelung der Interessen der deutschsprachigen REDCap-Community

Im Rahmen der Veranstaltung wurden aus der Gruppe der GUG-Mitglieder mit einfacher Mehrheit Sprecher für die Dauer von zwei Jahren gewählt. Das Sprecheramt wurde auf drei Personen aufgeteilt: **Dr. Peter Brunecker** (Charité – Geschäftsbereich IT / BIH – Core Facility IT, Berlin), **Dr. Günther Rezniczek** (Marien Hospital Herne, Ruhr-Universität Bochum) und **Christof Meigen** (Universitätsklinikum Leipzig) wurden einstimmig gewählt.

8. April 2022



From: projectredcap.org

Who is behind REDCap?

- Vanderbilt University, Nashville, Tennessee, U.S.A (Creator, Developer)
- REDCap Consortium (Feedback, Enhancements, Support)
 - > 6300 Partners
 - > 23.400 Publikationen seit 2009

Journal of Biomedical Informatics 42 (2009) 377–381

Research electronic data capture (REDCap)—A metadata-driven methodology and workflow process for providing translational research informatics support

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ABSTRACT

Research electronic data capture (REDCap) is a novel workflow methodology and software solution designed for rapid development and deployment of electronic data capture tools to support clinical and translational research. We present: (1) a brief description of the REDCap metadata-driven software toolset; (2) detail concerning the capture and use of study-related metadata from scientific research teams; (3) measures of impact for REDCap; (4) details concerning a consortium network of domestic and international institutions collaborating on the project; and (5) strengths and limitations of the REDCap system. REDCap is currently supporting 286 translational research projects in a growing collaborative network including 27 active partner institutions.

REDCap architecture: Client-server model

- **Client-side:** Users access REDCap through a web browser interface. It is compatible with popular browsers (Chrome, Firefox, Safari, IE) and requires no client-side installation or plugins.
- **Server-side:** REDCap is typically hosted on a web server running Linux, Windows, or macOS. It is built using PHP and JavaScript, with data stored in a relational database management system (MySQL or MariaDB).
- Concrete server implementation will vary (on premise, single box or multiple VMs, or even cloud deployment in AWS or Azure)

A few impressions

Impressions – Codebook



Logged in as gr | Log out

My Projects or Control Center

REDCap Messenger

Contact REDCap administrator

View project as user: ...select a user...

Enter PID to go to project

Project Home and Design

Project Home · Project Setup

Designer · Dictionary · Codebook

Project status: Development

Data Collection

Record Status Dashboard
- View data collection status of all records

Add / Edit Records
- Create new records or edit/view existing ones

Multiple 0

Applications

Project Dashboards

Alerts & Notifications

Multi-Language Management

Calendar

Data Exports, Reports, and Stats

Data Import Tool

Data Comparison Tool

Logging and Email Logging

Field Comment Log

File Repository

User Rights and DAGs

Customize & Manage Locking/E-signatures

Data Quality

API and API Playground

REDCap Mobile App

External Modules

Manage View Logs

AI Data Entry Annotations

Demo Project PID 233

[Project Home](#) [Project Setup](#) [Online Designer](#) [Data Dictionary](#) [Codebook](#)

The Codebook is a human-readable, read-only version of the project's Data Dictionary and serves as a quick reference for viewing the attributes of any given field in the project without having to download and interpret the Data Dictionary. Note: Checkbox fields have their coded values displayed both in the format defined by users in the Online Designer/Data Dictionary as well as in the extended format seen in data imports and exports (i.e., field__code).

[Print page](#) **Data Dictionary Codebook**

Field finder:

[^ Collapse all instruments](#)

| # | Variable / Field Name | Field Label <small>Field Note</small> | Field Attributes (Field Type, Validation, Choices, Calculations, etc.) |
|---|-----------------------|--|--|
| Instrument: Demographics (demographics) ^ Collapse | | | |
| | 1 [study_id] | Study ID | text |
| | 2 [date_enrolled] | Section Header: Consent Information Date subject signed consent YYYY-MM-DD | text (date_ymd) |
| | 3 [patient_document] | Upload the patient's consent form | file |
| | 4 [first_name] | Section Header: Contact Information First Name | text, Identifier |
| | 5 [last_name] | Last Name | text, Identifier |
| | 6 [address] | Street, City, State, ZIP | notes, Identifier |
| | 7 [telephone_1] | Phone number Include Area Code | text (phone), Identifier |
| | 8 [email] | E-mail | text (email), Identifier |

Impressions – Online form designer

DEVELOPMENT

REDCap
Logged in as gr | Log out
My Projects or Control Center
REDCap Messenger
Contact REDCap administrator
View project as user: -- select a user --
Enter PID to go to project

Demo Project PID 233

Project Home | Project Setup | **Online Designer** | Data Dictionary | Codebook

VIDEO: How to use this page | Create snapshot of instruments | Last snapshot: never ?

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

Data Collection Instruments

Form options:
Form Display Logic

+ Create a new instrument from scratch
Import a new instrument from the official REDCap Instrument Library
Upload instrument ZIP file from another project/user or external libraries

| Instrument name | Fields | View PDF | Instrument actions |
|----------------------------------|--------|----------|--------------------|
| Demographics | 25 | | Choose action ▾ |
| Baseline Data | 8 | | Choose action ▾ |
| Visit Lab Data | 5 | | Choose action ▾ |
| Patient Morale Questionnaire | 4 | | Choose action ▾ |
| Visit Blood Workup | 9 | | Choose action ▾ |
| Visit Observed Behavior | 14 | | Choose action ▾ |
| Completion Data | 12 | | Choose action ▾ |
| Completion Project Questionnaire | 13 | | Choose action ▾ |

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REDCap Mobile App

External Modules Manage View Logs
AI Data Entry Annotations

Impressions – Online form designer

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Demo Project PID 233 **DEVELOPMENT**

Project Home Project Setup Online Designer Data Dictionary Codebook

VIDEO: How to use this page Create snapshot of instruments Last snapshot: never ?

This page allows you to build and customize your data collection instruments one field at a time. You may add new fields or edit existing ones. New fields may be added by clicking the **Add Field** buttons. You can begin editing an existing field by clicking on the **Edit** icon. If you decide that you do not want to keep a field, you can simply delete it by clicking on the **Delete** icon. To reorder the fields, simply **drag and drop** a field to a different position within the form below. NOTE: While in development status, all field changes will take effect immediately in real time.

Return to list of instruments Next instrument >>

Current instrument: **Demographics** Preview instrument

Variable: study_id
Study ID

NOTE: The field above is the record ID field and thus cannot be deleted or moved. It can only be edited.

Add Field Add Matrix of Fields Import from Field Bank

Consent Information

Add Field Add Matrix of Fields Import from Field Bank

Variable: date_enrolled
Date subject signed consent Today Y-M-D
YYYY-MM-DD

Add Field Add Matrix of Fields Import from Field Bank

Variable: patient_document
Upload the patient's consent form [Upload file](#)

Add Field Add Matrix of Fields Import from Field Bank

Impressions – Field editor

The screenshot shows the REDCap 'Edit Field' dialog box. At the top, it says 'Demo Project PID 233'. Below that, a message explains that users can add new project fields by completing the form and clicking 'Save'. The 'Field Type' is set to 'Text Box (Short Text, Number, Date/Time, ...)'. The 'Field Label' is 'Date subject signed consent'. The 'Variable Name' is 'date_enrolled'. The 'Validation?' is set to 'Date (Y-M-D)'. The 'Required?' checkbox is checked. The 'Identifier?' checkbox is checked. The 'Custom Alignment' is set to 'Right / Vertical (RV)'. The 'Field Note' is 'YYYY-MM-DD'. There are 'Save' and 'Cancel' buttons at the bottom right. A red 'DEVELOPMENT' banner is visible in the top right corner of the interface.

REDCap Demo Project PID 233

Logged in as gr | Log out

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: Date subject signed consent Use the Rich Text Editor

Variable Name: date_enrolled Enable auto naming of variable based upon its Field Label? ONLY letters, numbers, and underscores

How to use: Smart Variables Piping Field Embedding

Validation? (optional): Date (Y-M-D)

Minimum: Maximum:

Tip for min/max limits: You may pipe a value from another field to set dynamic range limits - e.g., [visit_date] or [event_1_arm_1][age]. You may also use the word **today** or **now** (not wrapped in quotes) for date/time fields.

-- select ontology service --

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): YYYY-MM-DD Small reminder text displayed underneath field

Save Cancel

Impressions – Events



Logged in as gr | Log out

My Projects or Control Center

REDCap Messenger

Contact REDCap administrator

View project as user: -- select a user --

Enter PID to go to project

Project Home and Design

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Project status: Development

Data Collection

Record Status Dashboard
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Add / Edit Records
- Create new records or edit/view existing ones

Multiple 0

Applications

Project Dashboards

Alerts & Notifications

Multi-Language Management

Calendar

Data Exports, Reports, and Stats

Data Import Tool

Data Comparison Tool

Logging and Email Logging

Field Comment Log

File Repository

User Rights and DAGs

Customize & Manage Locking/E-signatures

Data Quality

API and API Playground

REDCap Mobile App

External Modules Manage View Logs

- AI Data Entry Annotations
- AI Survey Annotations
- AI Designer Enhancements
- EMDT Project Object Inspector
- EMDT Show Field Annotations - OFF

Demo Project PID 233

DEVELOPMENT

VIDEO: How to define events (5 min)

Project Setup Define My Events Designate Instruments for My Events

This application allows you to define 'events' for your project that allow for the **utilization of data collection forms multiple times for any given project record** (often used when collecting longitudinal data). An 'event' may be a temporal event in the course of your project, such as a participant visit or a task to be performed. After events have been defined, you will need to designate the data collection instruments that you wish to utilize for any or all events, thus allowing you to use a form for multiple events for the same project record. You may **group your events into 'arms'**, in which you may have one or more arms/groups for your project. Each arm can have as many events as you wish. You may use the table below to create new events and/or arms, or modify existing ones. (One arm and one event will be initially defined as the default for all projects.)

STEP #1:

To add new events below, provide an **Event Name** for that event, and then click the **Add new event**. Once events have been added, you can easily change their order by **dragging and dropping** the event using the up-down arrow icon on the far left for a given row in the table.

STEP #2:

Once you have defined your events on this page, you may navigate to the [Designate Instruments for My Events](#) page, where you may select which data collection instruments that you wish to utilize for each event you defined.

Upload or download arms/events

Arm 1: Drug A +Add New Arm

Arm name: **Drug A**

[Rename Arm 1](#)

| | Event # [event-number] | Event Label [event-label] | Custom Event Label [optional] | Unique event name (auto-generated) [event-name] | Event ID (auto-generated, unchangeable) [event-id] |
|----------------------|---------------------------|--|---|---|--|
| | 1 | Enrollment | | enrollment_arm_1 | 682 |
| | 2 | Dose 1 | | dose_1_arm_1 | 683 |
| | 3 | Visit 1 | | visit_1_arm_1 | 684 |
| | 4 | Dose 2 | | dose_2_arm_1 | 685 |
| | 5 | Visit 2 | | visit_2_arm_1 | 686 |
| | 6 | Dose 3 | | dose_3_arm_1 | 687 |
| | 7 | Visit 3 | | visit_3_arm_1 | 688 |
| | 8 | Final visit | | final_visit_arm_1 | 689 |
| Add new event | | | | | |
| | | <input type="text"/> | <input type="text"/> | | |
| | | <small>Descriptive name for this event</small> | <small>Custom Event Label (optional) Example: [visit_date].</small> | | |

Impressions – Events / forms grid



Logged in as gr | Log out

My Projects or Control Center

REDCap Messenger

Contact REDCap administrator

View project as user: -- select a user --

Enter PID to go to project

Project Home and Design

Project Home · Project Setup

Designer · Dictionary · Codebook

Project status: Development

Data Collection

Record Status Dashboard

Add / Edit Records

Multiple 0

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External Modules

Data Entry Annotations

Survey Annotations

Designer Enhancements

EMDT Project Object Inspector

EMDT Show Field Annotations - OFF

Demo Project

PID 233

[VIDEO: How to designate instruments \(3 min\)](#)

Project Setup Define My Events Designate Instruments for My Events

Since you have defined multiple events on the [Define My Events](#) page, you may now select which data collection instruments that you wish to utilize for each event by using the table below. This allows you to enter data on any data collection form multiple times for any given project record. Any and all data collection instruments can thus be used for any event defined.

Click the *Begin Editing* button to change the relationships below by designating which forms you wish to utilize for which events. When you are finished making changes, click the *Save* button to finalize your changes.

Upload or download instrument mappings

Begin Editing Save

| Data Collection Instrument | Enrollment (1) | Dose 1 (2) | Visit 1 (3) | Dose 2 (4) | Visit 2 (5) | Dose 3 (6) | Visit 3 (7) | Final visit (8) |
|----------------------------------|----------------|------------|-------------|------------|-------------|------------|-------------|-----------------|
| Demographics | ✓ | | | | | | | |
| Baseline Data | ✓ | | | | | | | |
| Visit Lab Data | | | ✓ | | ✓ | | ✓ | |
| Patient Morale Questionnaire | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Visit Blood Workup | | | ✓ | | ✓ | | ✓ | ✓ |
| Visit Observed Behavior | | | ✓ | | ✓ | | ✓ | ✓ |
| Completion Data | | | | | | | | ✓ |
| Completion Project Questionnaire | | | | | | | | ✓ |

Impressions – Survey Tools

REDCap

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REDCap Messenger

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Enter PID to go to project

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- Designer · Dictionary · Codebook
- Project status: Development

Data Collection

- Survey Distribution Tools**
- Get a public survey link or build a participant list for inviting respondents
- Record Status Dashboard
- View data collection status of all records
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- REDCap Mobile App

External Modules Manage View Logs

- AI Data Entry Annotations
- AI Survey Annotations
- AI Designer Enhancements

TEST - Multi-Language Management PID 15

Survey Distribution Tools

Public Survey Link Participant List Survey Invitation Log

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

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

The survey link below applies only to **"Basic Demography" - Event 1 (Arm 1: Arm 1)**

Public Survey URL:

Link Actions

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

Link Customizations

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

NOTICE TO ADMINISTRATOR: The Google reCAPTCHA feature for protecting public surveys is currently DISABLED at the system-level for all projects, but if you wish, you may enable the option on the [Modules/Services Configuration](#) page in the Control Center. This option will allow users to add protection to their public survey using Google's reCAPTCHA functionality, which can prevent bots from entering trash data into a public survey.

Example Survey

AAA

[English](#)

English Deutsch

These are your survey instructions that you would enter for your survey participants. You may put whatever text you like here, which may include information about the purpose of the survey, who is taking the survey, or how to take the survey.

Surveys can use a single survey link for all respondents, which can be posted on a webpage or emailed out from your email application of choice. **By default, all survey responses are collected anonymously** (that is, unless your survey asks for name, email, or other identifying information). If you wish to track individuals who have taken your survey, you may upload a list of email addresses into a Participant List within REDCap, in which you can have REDCap send them an email invitation, which will track if they have taken the survey and when it was taken. This method still collects responses anonymously, but if you wish to identify an individual respondent's answers, you may do so by also providing an Identifier in your Participant List. Of course, in that case you may want to inform your respondents in your survey's instructions that their responses are not being collected anonymously and can thus be traced back to them.

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.)

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
- Etc.



You may also set multiple choice questions as **DROP-DOWN** MENUS.

Next Page >>

Impressions – Rights management

Creating new role "Dateneingabe"

You may set the rights for the user below by checking the boxes next to the application tools to which you wish to grant them access. You may also grant them or deny them access to individual data collection instruments, if so desired. To save your selections, click the "Create role" button at the bottom of the page.

Creating new role "Dateneingabe"

Basic Privileges

Highest level privileges:

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

Other privileges:

- Alerts & Notifications
- Calendar
- Add/Edit/Organize Reports
Also allows user to view ALL reports (but not necessarily all data in the reports)
- Stats & Charts
- Data Import Tool
- Data Comparison Tool
- Logging
- File Repository
- Data Quality
 - Create & edit rules
 - Execute rules
- API
 - API Export
 - API Import/Update

Settings pertaining to the REDCap Mobile App:

- REDCap Mobile App
 - Allows user to collect data offline in the mobile app
- Allow user to download data for all records to the app?

Privileges for Viewing and Exporting Data

Data Viewing Rights pertain to a user's ability to view or edit data on pages in the project (e.g., data entry forms, reports). Users with 'No Access' Data Viewing Rights for a given instrument will not be able to view that instrument for any record, nor will they be able to view fields from that instrument on a report. Data Export Rights pertain to a user's ability to export data from the project, whether through the Data Exports page, API, Mobile App, or in PDFs of instruments containing record data. Note: Data Viewing Rights and Data Export Rights are completely separate and do not impact one another.

| | Data Viewing Rights | | | Data Export Rights | | | |
|----------------------------------|-----------------------|-----------------------|----------------------------------|-----------------------|-----------------------|------------------------------|----------------------------------|
| | No Access (Hidden) | Read Only | View & Edit | No Access | De-Identified* | Remove All Identifier Fields | Full Data Set |
| Demographics | <input type="radio"/> | <input type="radio"/> | <input checked="" type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input checked="" type="radio"/> |
| Baseline Data | <input type="radio"/> | <input type="radio"/> | <input checked="" type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input checked="" type="radio"/> |
| Visit Lab Data | <input type="radio"/> | <input type="radio"/> | <input checked="" type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input checked="" type="radio"/> |
| Patient Morale Questionnaire | <input type="radio"/> | <input type="radio"/> | <input checked="" type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input checked="" type="radio"/> |
| Visit Blood Workup | <input type="radio"/> | <input type="radio"/> | <input checked="" type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input checked="" type="radio"/> |
| Visit Observed Behavior | <input type="radio"/> | <input type="radio"/> | <input checked="" type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input checked="" type="radio"/> |
| Completion Data | <input type="radio"/> | <input type="radio"/> | <input checked="" type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input checked="" type="radio"/> |
| Completion Project Questionnaire | <input type="radio"/> | <input type="radio"/> | <input checked="" type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input checked="" type="radio"/> |

* De-identified means that all free-form text fields will be removed, as well as any date/time fields and Identifier fields.

External Modules: Configuration Permissions

Privileges may be defined regarding whether the user can set or modify the configuration of an External Module that has been enabled on this project. Below are the currently enabled modules. NOTE: Only administrators may modify the module configuration permissions here.

- Admin Insights*
- Custom Footer*
- Enhanced Configuration Dialog*
- External Module Developer Tools*
- Modify Contact Admin Button*
- Multiple*
- REDCap Instance Indicator*
- REDCap Translation Assistant*

DEVELOPMENT

Create role **Cancel**

Impressions – Report builder



Logged in as gr | Log out

- My Projects or Control Center
- REDCap Messenger
- Contact REDCap administrator
- View project as user: -- select a user --
- Enter PID to go to project

Project Home and Design

- Project Home
- Project Setup
- Designer
- Dictionary
- Codebook
- Project status: Development

Data Collection

- Record Status Dashboard
- Add / Edit Records
- Multiple

Applications

- Project Dashboards
- Alerts & Notifications
- Multi-Language Management
- Calendar
- Data Exports, Reports, and Stats
- Data Import Tool
- Data Comparison Tool
- Logging and Email Logging
- Field Comment Log
- File Repository
- User Rights and DAGs
- Customize & Manage Locking/E-signatures
- Data Quality
- API and API Playground
- REDCap Mobile App

External Modules

- Data Entry Annotations
- Survey Annotations
- Designer Enhancements
- EMDT Project Object Inspector
- EMDT Show Field Annotations - OFF

Demo Project PID 233



Data Exports, Reports, and Stats

[VIDEO: How to use Data Exports, Reports, and Stats](#)

- Create New Report
- My Reports & Exports
- Other Export Options

You may create a new report by selecting the fields/variables below that you want to include in the report. You may add as many fields to your report as you wish, and you can choose which users may view this report. You will also need to provide a name for your report, which will then be displayed on the project's left-hand menu for anyone to whom you have given access. You can filter the results returned in the report in a variety of ways, including using complex AND/OR logic. When you are finished, click the Save Report button at the bottom. The new report will then be added to your list of reports, after which you may immediately begin viewing them or exporting them.

| | |
|--|---|
| Name of Report: | <input type="text" value="Report"/> |
| Set as "public": | Enabling this feature below will auto-generate a public link for viewing the report without needing to log in to REDCap. <input type="checkbox"/> Report is publicly viewable by anyone with the public link |
| Description (optional): <small>Displayed on page below report name</small> | <div style="border: 1px solid #ccc; padding: 5px;"><p>Paragraph</p><p>Paragraph</p></div> |

STEP 1

User Access: Choose who can edit and view this report

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

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

Edit Access: Choose who can edit, copy, or delete this report (requires user to have 'Add/Edit/Organize Reports' privileges)

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

STEP 2

Fields to include in report + Quick Add Add all fields from selected instrument: -- choose instrument --

| | | |
|---------|---------------------|--------------------------|
| Field 1 | study_id "Study ID" | Instrument: Demographics |
|---------|---------------------|--------------------------|



Impressions – Reports



Marien Hospital Herne - Universitätsklinikum der Ruhr-Universität Bochum
Frauenklinik

Logged in as gr | Log out

My Projects or Control Center

Contact REDCap administrator

View project as user: -- select a user --

Enter PID to go to project

Project Home and Design

- Project Home
- Project Setup
- Designer
- Dictionary
- Codebook

Project status: **Production**

Data Collection

- Survey Distribution Tools
- Record Status Dashboard
- Add / Edit Records

Applications

- Project Dashboards
- Alerts & Notifications
- Multi-Language Management
- Calendar
- Data Exports, Reports, and Stats
- Data Import Tool
- Data Comparison Tool
- Logging and Email Logging
- File Repository
- User Rights and DAGs
- Customize & Manage Locking/E-signatures
- Data Quality and Resolve Issues
- API and API Playground
- REDCap Mobile App

Project Bookmarks [Edit](#)

- Online-Fragebogen

Reports [Search](#) [Organize](#) [Edit](#)

- 1) Gruppen
- 2) 2A before

Einfluss eines VR-Headsets auf Schmerzempfinden und Zufriedenheit im Rahmen der kolposkopischen Abklärung zervikaler Präkanzerosen: eine monozentrische randomisiert-kontrollierte Studie

PID 153

Data Exports, Reports, and Stats [VIDEO: How to use Data Exports, Reports, ar](#)

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

Number of results returned: 247 [Stats & Charts](#) [Export Data](#) [Print Page](#) [Edit Report](#)

Total number of records queried: 1 165
(*records* = total available data across all designated events)
Report execution time: 0 seconds

Checkliste

| Studien-ID study_id | Event Name redcap_event_name | Repeat Instrument redcap_repeat_instrument | Repeat Instance redcap_repeat_instance | Puls bei Anamnese/Aufklärung (alle Gruppen) puls1 | Puls nach VR, vor Kolposkopie (Gruppen VOR und VOR+WÄHREND) puls2 | Puls nach Kolposkopie (alle Gruppen) puls3 | Programm vor Kolposkopie (VOR und VOR+WÄHRE) prog_before |
|------------------------|---------------------------------|---|---|--|--|---|---|
| 10001 | Anamnese | | | 88 | | 80 | |
| 10002 | Anamnese | | | 64 | 80 | 76 | Strand (s) |
| 10003 | Anamnese | | | 74 | 80 | 64 | In der Natur (r |
| 10004 | Anamnese | | | 84 | 74 | 72 | Strand (s) |
| 10005 | Anamnese | | | 80 | 76 | 76 | Strand (s) |
| 10006 | Anamnese | | | 64 | | 80 | |
| 10007 | Anamnese | | | 78 | 84 | 96 | Strand (s) |
| 10008 | Anamnese | | | 84 | 72 | 72 | Strand (s) |
| 10009 | Anamnese | | | 76 | | 64 | |
| 10010 | Anamnese | | | 64 | | 60 | |
| 10011 | Anamnese | | | 84 | | 76 | |
| 10012 | Anamnese | | | 84 | 80 | 96 | Strand (s) |

Impressions – Simple stats



- Data Exports, Reports, and Stats
- Data Import Tool
- Data Comparison Tool
- Logging and Email Logging
- File Repository
- User Rights and DAGs
- Customize & Manage Locking/E-signatures
- Data Quality and Resolve Issues
- API and API Playground
- REDCap Mobile App

Project Bookmarks [Edit](#)

Online-Fragebogen

Reports [Search](#) [Organize](#) [Edit](#)

1) Gruppen

External Modules [Manage](#) [View Logs](#)

Help & Information [-](#)

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

[Contact REDCap administrator](#)

Datenschutz

Marien Hospital Herne -
Universitätsklinikum der Ruhr-Universität
Bochum

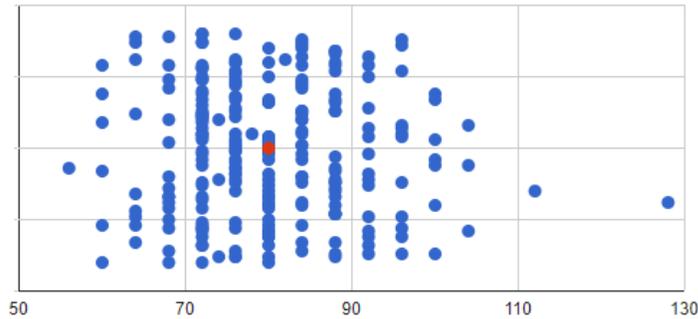
[Impressum](#) | [Datenschutz](#)

Puls bei Anamnese/Aufklärung (alle Gruppen) *(puls1)* [Refresh Plot](#)

| Total Count (N) | Missing* | Unique | Min | Max | Mean | StDev | Sum | Percentile | | | | | | |
|-----------------|----------|--------|-----|-----|-------|-------|--------|------------|------|------|-------------|------|------|------|
| | | | | | | | | 0,05 | 0,10 | 0,25 | 0,50 Median | 0,75 | 0,90 | 0,95 |
| 247 | 0 (0,0%) | 18 | 56 | 128 | 80,01 | 10,35 | 19 762 | 64 | 68 | 72 | 80 | 88 | 92 | 96 |

Lowest values: 56, 60, 60, 60, 60

Highest values: 104, 104, 104, 112, 128

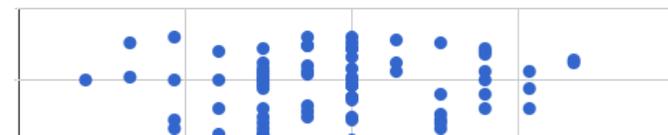


Puls nach VR, vor Kolposkopie (Gruppen VOR und VOR+WÄHREND) *(puls2)* [Refresh Plot](#)

| Total Count (N) | Missing* | Unique | Min | Max | Mean | StDev | Sum | Percentile | | | | | | |
|-----------------|------------|--------|-----|-----|-------|-------|--------|------------|-------|------|-------------|------|------|------|
| | | | | | | | | 0,05 | 0,10 | 0,25 | 0,50 Median | 0,75 | 0,90 | 0,95 |
| 162 | 85 (34,4%) | 15 | 56 | 100 | 77,20 | 8,97 | 12 507 | 64 | 65,30 | 72 | 76 | 83 | 88 | 92 |

Lowest values: 56, 60, 60, 60, 60

Highest values: 96, 96, 96, 100, 100



Impressions – Alerts & Notifications

REDCap

Logged in as gr | Log out

My Projects or Control Center

REDCap Messenger

Contact REDCap administrator

View project as user: -- select a user --

Enter PID to go to project

Project Home and Design

Project Home · Project Setup

Designer · Dictionary · Codebook

Project status: Development

Data Collection

Survey Distribution Tools

Record Status Dashboard

Add / Edit Records

Multiple 0

Applications

Project Dashboards

Alerts & Notifications

Multi-Language Management

Calendar

Data Exports, Reports, and Stats

Data Import Tool

Data Comparison Tool

Logging and Email Logging

Field Comment Log

File Repository

User Rights and DAGs

Customize & Manage Locking/E-signatures

Data Quality

API and API Playground

REDCap Mobile App

External Modules

- Data Entry Annotations
- Survey Annotations
- Designer Enhancements

TEST - Multi-Language Management PID 15

Alerts & Notifications

The Alerts & Notifications feature allows you to construct alerts and send customized notifications. These notifications may be sent to one or more recipients and can be triggered or scheduled when a form/survey is saved and/or based on conditional logic whenever data is saved or imported. When adding/editing an alert, you will need to 1) set how the alert gets triggered, 2) define when the notification should be sent (including how many times), and 3) specify the recipient, sender, message text, and other settings for the notification. For the message, you may utilize customized options such as rich text, the piping of field variables (including Smart Variables), and uploading multiple file attachments. [Learn more](#)

My Alerts | Notification Log

Upload or download Alerts ?

Add New Alert | Re-evaluate Alerts

Show deactivated alerts

Search

Alert #1: Test Edit Options Unique Alert ID: A-1

Every time the instrument "Basic Demography Form (Event 1 (Arm 1: Arm 1))" is saved and has a Complete status.

Send immediately

Repeated sending (when triggered)

Activity: 45 records were alerted (view list) Last sent: 2023-03-03 16:14

Email Preview

From: Test X <guenther.rezniczek@rub.de>

To: guenther.rezniczek@rub.de

Subject: Alert 1 English

Alert 1 English Body

Alert #2 Edit Options Unique Alert ID: A-7

When the instrument "Basic Demography Form (Event 1 (Arm 1: Arm 1))" is saved and has a Complete status.

Send immediately

Send one time (only once per record - i.e., never re-trigger)

Activity: 44 records were alerted (view list) Last sent: 2023-03-03 16:14

Email Preview

From: guenther.rezniczek@rub.de

To: guenther.rezniczek@rub.de

Subject: Alert 2 English

Alert 2 English Body

Alert #3: asfsaf Edit Options Unique Alert ID: A-163

When the instrument "Basic Demography Form [Any Event]" is saved and has any form status.

Send immediately

Email Preview

From: asfsaf <guenther.rezniczek@rub.de>

To: guenther.rezniczek@rub.de

Subject: asfsaf

Impressions – Language support

The sidebar navigation menu for REDCap includes the following sections:

- Logged in as gr | Log out
- My Projects or Control Center
- REDCap Messenger
- Contact REDCap administrator
- View project as user: -- select a user --
- Enter PID to go to project
- Project Home and Design**
 - Project Home · Project Setup
 - Designer · Dictionary · Codebook
 - Project status: Development
- Data Collection**
 - Survey Distribution Tools
 - Get a public survey link or build a participant list for inviting respondents
 - Record Status Dashboard
 - View data collection status of all records
 - Add / Edit Records
 - Create new records or edit/view existing ones
 - Multiple 0
- Applications**
 - Project Dashboards
 - Alerts & Notifications
 - Multi-Language Management
 - Calendar
 - Data Exports, Reports, and Stats
 - Data Import Tool
 - Data Comparison Tool
 - Logging and Email Logging
 - Field Comment Log
 - File Repository
 - User Rights and DAGs
 - Customize & Manage Locking/E-signatures
 - Data Quality
 - API and API Playground
 - REDCap Mobile App
- External Modules**
 - Manage View Logs
 - AI Data Entry Annotations
 - AI Survey Annotations
 - AI Designer Enhancements

TEST - Multi-Language Management PID 15



Multi-Language Management

[VIDEO: How to use Multi-Language Management](#)

On this page you can create and configure multiple display languages for your project (for surveys, data entry forms, alerts, survey invitations, etc.) or alternatively export and import translations using a file. Do not forget to **save your changes** (keyboard shortcut: **CTRL-S**) at any time on this page when you are done editing. NOTE: [This page will not auto-translate your text for you](#), but provides tools so that you may easily translate them yourself. [Learn more.](#)

[Languages](#) [Forms/Surveys](#) [Alerts](#) [Misc](#) [User Interface](#) [Settings](#) — [Save Changes](#)

Manage the available languages in this project using the table and options below by following these steps:

1. Create your default language (i.e., used when creating your fields, instruments, etc.). This will serve as the reference for the other languages.
2. Add other languages that you wish to offer as a translation of the default language.
3. Translate your default text into different languages by clicking the tabs above or the icons to the right of each language below.
4. Test your translations by switching back and forth between languages on your data entry forms and/or surveys. Note that only active languages will be available for selection on those places.
5. Learn how to implement some language-related action tags, such as `@LANGUAGE-SET`, if desired. Learn about them here: [@ Action Tags](#)

[+ Add a new language](#) Export or import general settings ? : [↔](#) [↔](#)

| ID | Display Name | Edit | Active | Default | Fallback | RTL ? | Actions |
|----|--------------|------|-------------------------------------|----------------------------------|----------------------------------|-------------------------------------|---------|
| en | English | | <input checked="" type="checkbox"/> | <input checked="" type="radio"/> | <input checked="" type="radio"/> | <input type="checkbox"/> | |
| de | Deutsch | | <input checked="" type="checkbox"/> | <input type="radio"/> | <input type="radio"/> | <input type="checkbox"/> | |
| fr | French | | <input checked="" type="checkbox"/> | <input type="radio"/> | <input type="radio"/> | <input type="checkbox"/> | |
| ar | Arabic | | <input checked="" type="checkbox"/> | <input type="radio"/> | <input type="radio"/> | <input checked="" type="checkbox"/> | |
| es | Spanish | | <input checked="" type="checkbox"/> | <input type="radio"/> | <input type="radio"/> | <input type="checkbox"/> | |

(Optional) For surveys, designate a field for storing a participant's language preference

Use this feature to set a source for a participant's language preference (their initial language setting). This must be a radio or dropdown field with choices matching the language ID you have defined for each language above, or a text box field with no field validation. The value of this field can be set manually through data entry/data import or with the `@LANGUAGE-CURRENT-FORM/SURVEY` action tags. The value of this setting will dictate the language used for rendering Automated Survey Invitations, Alerts, and PDFs. Text box fields are denoted with [T] while radio and dropdown fields are denoted with [R] and, in case they include all language keys, are highlighted with a green background.

And much more ...

Field Comment Log

This page displays the Field Comment Log for all records/events/fields in this project. You may use the controls below to perform keyword searches in the comments as well as filter the comments by record, event, field, or data access group. Keep in mind that if you do not have user privileges to view a comment, it will not appear in this table. Also, if you have the necessary privileges, you can click the Comment Log icon to view the comment.

Export (CSV): All logging All pages using current filters Current page

Field Comment Log

This module lists all changes made to the project. You can filter the results by event, user name, record, or time range. Clicking on a result will display the comment for that event. By default, only the logged-in user's comments are displayed.

| Time / Date | User |
|------------------|------|
| 2023-05-23 22:04 | |
| 2023-05-23 22:04 | |

File Repository

The File Repository allows users to store, organize, and share files used for this project. Folders and sub-folders can be created and deleted. Users with appropriate privileges can access a new folder section to create new folders. Files can be uploaded, deleted, or moved. After a file is uploaded, it will be available to all users with appropriate privileges within a specified number of days, after which they will be deleted.

Select files to upload

All Files

- Name
- Data Export
- Miscellaneous
- Recycle Bin

Showing 1 to 3 of 3 entries

Data Quality

This module will allow you to execute data quality rules upon your project data to check for some pre-defined data rules that you may utilize and run. You may also create your own rules already created. To find discrepancies for a given rule, simply click the Execute button. The results will be displayed in a table. You can click on the discrepancies by clicking on the rule name.

| Rule # | Rule Name | Execute |
|--------|---|---------|
| A | Blank values | |
| B | Blank values | |
| C | Field values | |
| D | Field values | |
| E | Outliers for numerical fields (numbers, integers, sliders, calc fields)** | - |
| F | Hidden fields that contain values*** | - |
| G | Multiple choice fields with invalid values | - |
| H | Incorrect values for calculated fields | - |
| I | Fields containing "missing data codes" | - |

Project Dashboards

+ Create New Dashboard | My Project Dashboards

Project Dashboards are pages with dynamic content that can be used to display data. They can include **Tables, and Smart Charts** that can perform aggregate calculations. Project dashboards have two basic attributes: they can be used to display data, and they can be used to display data. Project Design privileges can create and edit them. A user with Project Design privileges can create and edit them. A user with Project Design privileges can create and edit them. A user with Project Design privileges can create and edit them.

Data Import Tool

This module may be used for importing data into this project from a CSV file or alternatively from an XML file in CDISC ODM format. Below are the steps you will need to follow in order to import your data successfully into this project.

NOTICE: This project is currently in Development status. **Real data should NOT be entered** until the project has been moved to Production status.

CSV import CDISC ODM (XML) import

Instructions:

- 1.) Click the link below to download your data import template as a CSV file. Save it locally to your computer and then open it to begin filling it with the data you wish to import.
 - Download your Data Import Template (with records in rows)
 - OR
 - Download your Data Import Template (with records in columns)
- 2.) In each column of the Data Import Template file that you downloaded, place the data for each record that you wish to import. Once all your data has been added, save the file.
 - Be sure not to change the Variables/Field Names in the file or an error may occur.
 - All multiple choice fields (e.g., dropdown, radio) must have the raw coded value (rather than the choice label) entered in those cells, or else it cannot be processed. These can be found in the [Codebook](#).
 - Any empty rows or columns in the file can be safely deleted before importing the file. Doing this reduces the upload processing time, especially for large projects.
- 3.) Click the 'Browse' or 'Choose File' button below to select the file on your computer, and upload it by clicking the 'Upload File' button.
- 4.) Once your file has been uploaded, the data will NOT be immediately imported but will be displayed and checked for errors to ensure that all the data is in correct format before it is finally imported into the project.

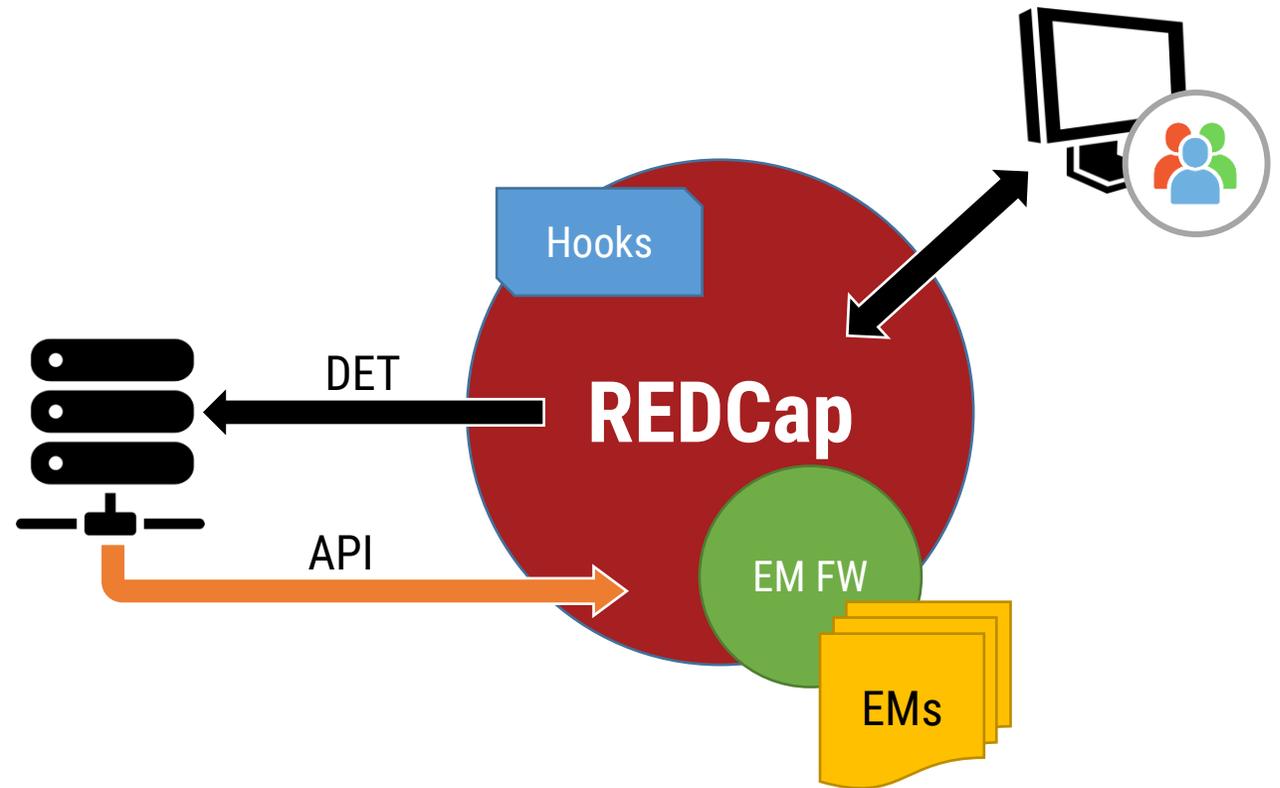
How to import records for events:
In order to import records for longitudinal projects such as this one, you must use the 'redcap_event_name'

And if this is not enough ...

Let's see what we can do to help this!

Extensibility options

- Data Entry Triggers
- API
- Legacy Plugins/Hooks
- External Modules



- All have their advantages and drawbacks

- Fire each time a form/survey is saved (via direct entry only; not triggering for imports)

Data Entry Trigger

The Data Entry Trigger is an advanced feature. It provides a way for REDCap to trigger a call to a remote web address (URL), in which it will send a HTTP POST request to the specified URL whenever *any* record or survey response has been created or modified on *any* data collection instrument or survey in this project (it is *not* triggered by data imports - including API imports and Mobile App imports - but only by normal data entry on surveys and data entry forms). Its main purpose is for notifying other remote systems outside REDCap at the very moment a record/response is created or modified, whose purpose may be to trigger some kind of action by the remote website, such as making a call to the REDCap API. [View more details](#)

URL of website:

Test

[How to use Piping in the URL](#)

Example: https://www.mywebsite.com/redcap_trigger_receive/

Example: </det/index.php>

- POST request with a number of data items →
- The receiving service is free to do whatever it wants – e.g., retrieve or calculate some data and push it back via the API

The Data Entry Trigger is an advanced feature. It provides a way for REDCap to trigger a call to a remote web address (URL), in which it will send a HTTP POST request to the specified URL whenever *any* record or survey response has been created or modified on *any* data collection instrument or survey in this project (it is *not* triggered by data imports - including API imports and Mobile App imports - but only by normal data entry on surveys and data entry forms). Its main purpose is for notifying other remote systems outside REDCap at the very moment a record/response is created or modified, whose purpose may be to trigger some kind of action by the remote website, such as making a call to the REDCap API.

In the HTTP Post request, the following parameters will be sent by REDCap in order to provide a context for the record that has just been created/modified:

- **project_id** - The unique ID number of the REDCap project (i.e. the 'pid' value found in the URL when accessing the project in REDCap).
- **username** - The username of the REDCap user that is triggering the Data Entry Trigger. Note: If it is triggered by a survey page (as opposed to a data entry form), then the username that will be reported will be '[survey respondent]'.
- **instrument** - The unique name of the current data collection instrument (all your project's unique instrument names can be found in column B in the data dictionary).
- **record** - The name of the record being created or modified, which is the record's value for the project's first field.
- **redcap_event_name** - The unique event name of the event for which the record was modified (for longitudinal projects only).
- **redcap_data_access_group** - The unique group name of the Data Access Group to which the record belongs (if the record belongs to a group).
- **[instrument]_complete** - The status of the record for this particular data collection instrument, in which the value will be 0, 1, or 2. For data entry forms, 0=Incomplete, 1=Unverified, 2=Complete. For surveys, 0=partial survey response and 2=completed survey response. This parameter's name will be the variable name of this particular instrument's status field, which is the name of the instrument + '_complete'.
- **redcap_repeat_instance** - The repeat instance number of the current instance of a repeating event OR repeating instrument. Note: This parameter is only sent in the request if the project contains repeating events/instruments *and* is currently saving a repeating event/instrument.
- **redcap_repeat_instrument** - The unique instrument name of the current repeating instrument being saved. Note: This parameter is only sent in the request if the project contains repeating instruments *and* is currently saving a repeating instrument. Also, this parameter will not be sent for repeating events (as opposed to repeating instruments).
- **redcap_url** - The base web address to REDCap (URL of REDCap's home page), i.e., <https://dev-redcap/>
- **project_url** - The base web address to the current REDCap project (URL of its Project Home page), i.e., https://dev-redcap/redcap_v13.5.4/index.php?pid=XXXX

NOTE: If the names of your records (i.e. the values of your first field) are considered identifiers (e.g., SSN, MRN, name), for security's sake it is highly recommended that you use an encrypted connection (i.e. SSL/HTTPS) for the URL you provide for the Data Entry Trigger.

- The REDCap API (Application Programming Interface) is a powerful tool that allows developers to interact programmatically with REDCap projects.
- API Access & API Tokens: Controlled by project admins. A token is user-specific and acts as an authentication/authorization mechanism.
- The API endpoint supports a number of methods
- Multiple request/response formats supported (JSON, XML, CSV)

API API Export API Import/Update
[What is the REDCap API?](#)

My Token Manage All Project Tokens

Your API token for project "Demo Project"

The API token below is **ONLY** for you and will work **ONLY** with this project. This token allows special access to REDCap data and **should NOT be shared with others**. If you think your token has been compromised, then please contact your REDCap administrator immediately **AND** either delete or regenerate your token by using the buttons below.

API Token: 4C6C38EE998810CD05AFE6190B1BB75A

Delete token Finished using the API for this project? If so, please delete your token for security reasons.

Regenerate token Think someone else knows your token? If so, please regenerate your token for security reasons.

The following user(s) have API tokens for this project: gn

Arms

[Export Arms](#)

[Import Arms](#)

[Delete Arms](#)

Data Access Groups

[Export DAGs](#)

[Import DAGs](#)

[Delete DAGs](#)

[Switch DAG](#)

[Export User-DAG Assignment](#)

[Import User-DAG Assignment](#)

Events

[Export Events](#)

[Import Events](#)

[Delete Events](#)

Field Names

[Export List of Export Field Names](#)

Files

[Export a File](#)

[Import a File](#)

[Delete a File](#)

File Repository

[Create a New Folder in the File Repository](#)

[Export a List of Files/Folders from the File Repository](#)

[Export a File from the File Repository](#)

[Import a File into the File Repository](#)

[Delete a File from the File Repository](#)

Instruments

[Export Instruments \(Data Entry Forms\)](#)

[Export PDF file of Instruments](#)

[Export Instrument-Event Mappings](#)

[Import Instrument-Event Mappings](#)

Logging

[Export Logging](#)

Metadata

[Export Metadata \(Data Dictionary\)](#)

[Import Metadata \(Data Dictionary\)](#)

Projects

[Create Project](#)

[Import Project Info](#)

[Export Project Info](#)

[Export Project XML](#)

Records

[Export Records](#)

[Import Records](#)

[Delete Records](#)

[Rename Record](#)

[Generate Next Record Name](#)

Repeating Instruments and Events

[Export Repeating Instruments and Events](#)

[Import Repeating Instruments and Events](#)

Reports

[Export Reports](#)

REDCap

[Export REDCap Version](#)

Surveys

[Export a Survey Link](#)

[Export Survey Participants](#)

[Export a Survey Queue Link](#)

[Export a Survey Return Code](#)

Users & User Privileges

[Export Users](#)

[Import Users](#)

[Delete Users](#)

User Roles

[Export User Roles](#)

[Import User Roles](#)

[Delete User Roles](#)

[Export User-Role Assignment](#)

[Import User-Role Assignment](#)

API Playground

- Useful for getting to know the API
- Performs life actions on the project
- Provides ready-to-use code snippets for various languages

API Playground

The API Playground is an interface that allows experimentation with the REDCap API without actually writing any code. You can explore all the different API methods and their various options to customize a given API request. You may even execute a real API request and see the exact response that REDCap returns from the request. If you are interested in creating an API script, the section at the bottom will provide code samples for various programming languages to give you a head start. For details on the capabilities of the REDCap API and how to use it, please see the [REDCap API documentation](#).

Select an API method from the drop-down list below, after which it will load any other options that are specific to that method.

API Method:

Format:

Errors:

Raw Request Parameters

Displayed in the box below are all the POST parameters that would be sent in the API request based on the selections above.

```
token: 4C6C38EE998810CD05AFE6190B1BB75A
content: project
format: json
returnFormat: json
```

Response

Click the Execute Request button to execute a real API request, and it will display the API response in a text box below.

Execute Request

PHP
 Perl
 Python
 Ruby
 Java
 R
 cURL

Displayed in the box below is the code you would use to execute this API request in the selected programming language.

```
<?php
$data = array(
    'token' => '4C6C38EE998810CD05AFE6190B1BB75A',
    'content' => 'project',
    'format' => 'json',
```

API Playground

Select an API method from the drop-down list below, after which it will load any other options that are specific to that method.

API Method:

Format:

Filter by event:

Filter by user name:

Filter by record:

Filter by time range from to

Errors:

```
<?php
$data = array(
    'token' => '4C6C38EE998810CD05AFE6190B1BB75A',
    'content' => 'log',
    'logtype' => 'record_edit',
    'user' => '',
    'record' => '',
    'beginTime' => '2023-05-01 00:00',
    'endTime' => '',
    'format' => 'json',
    'returnFormat' => 'json'
);
$ch = curl_init();
curl_setopt($ch, CURLOPT_URL, 'https://dev-redcap/api/');
curl_setopt($ch, CURLOPT_RETURNTRANSFER, true);
curl_setopt($ch, CURLOPT_SSL_VERIFYPEER, false);
curl_setopt($ch, CURLOPT_VERBOSE, 0);
curl_setopt($ch, CURLOPT_FOLLOWLOCATION, true);
curl_setopt($ch, CURLOPT_AUTOREFERER, true);
curl_setopt($ch, CURLOPT_MAXREDIRS, 10);
curl_setopt($ch, CURLOPT_CUSTOMREQUEST, 'POST');
curl_setopt($ch, CURLOPT_FRESH_CONNECT, 1);
curl_setopt($ch, CURLOPT_POSTFIELDS, http_build_query($data, '', '&'));
$output = curl_exec($ch);
print $output;
curl_close($ch);
```

- E.g., Import a File

Permissions Required

To use this method, you must have API Import/Update privileges in the project.

Parameters (case sensitive)

Required

token

The API token specific to your REDCap project and username (each token is unique to each user for each project). See the section on the left-hand menu for obtaining a token for a given project.

content

file

action

import

record

the record ID

field

the name of the field that contains the file

event

the unique event name - only for longitudinal projects

repeat_instance

(only for projects with repeating instruments/events) The repeat instance number of the repeating event (if longitudinal) or the repeating instrument (if classic or longitudinal). Default value is '1'.

file

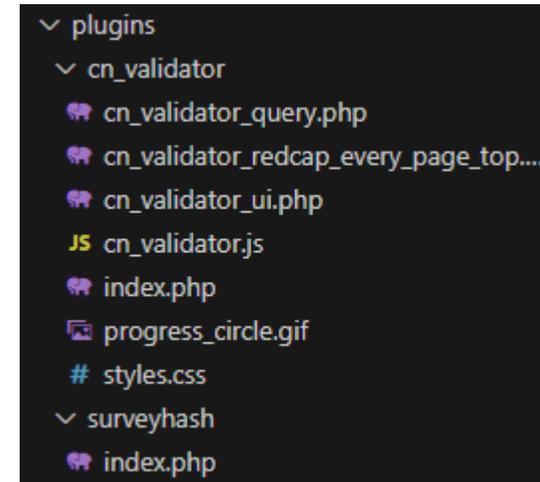
the contents of the file

Optional

returnFormat

csv, json, xml - specifies the format of error messages. If you do not pass in this flag, it will select the default format for you passed based on the 'format' flag you passed in or if no format flag was passed in, it will default to 'xml'.

- Any custom PHP script(s) on the server
- Accessed via a bookmark or custom application link
- Can look like REDCap pages (headers/footers)
- Can interact with REDCap (developer methods)
- Cannot modify REDCap pages



- However,
 - they need lot of manual setup;
 - there are no administration tools;
 - there is versioning, etc.

| Link # | Link Label | Link URL / Destination | Link Type | User Access | Opens new window | Append record info to URL | Append project ID to URL | Delete |
|------------------------------------|---|---|-------------|---|--------------------------|---------------------------|--------------------------|--------|
| <input type="button" value="Add"/> | <input type="text"/> <small>Enter the label for the link as it is seen on the left-hand menu</small> | <input type="text"/> <small>Enter the web address (URL) for the link (e.g., http://www.mysite.com/mypage.html)</small> | Simple Link | <input checked="" type="radio"/> All users <input type="radio"/> Selected users Excluded projects | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |

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

- Hook file (PHP) that lives on the REDCap server
- Implement “hooks”
- Can only work “inside” REDCap pages

- Same drawbacks as for Plugins + one bad code file can bring down the whole REDCap instance

REDCap Hooks

To utilize REDCap hooks, you must specify the full file path to your Hook Functions file, which is a PHP file on your REDCap web server that contains all your hook functions. You may place the Hook Functions file in any directory you wish, and you may name it anything you wish. Once you have created it, provide its full file path here so that REDCap may then begin to utilize any hook functions inside it. For more info on REDCap hooks, see the documentation by clicking the 'Plugin, Hook, & External Module Documentation' link on the left-hand menu

Full path to your PHP file containing your REDCap hook functions

Example: /home/gr/redcap/hooks.php

Hook functions

[redcap_add_edit_records_page](#)

[redcap_control_center](#)

[redcap_custom_verify_username](#)

[redcap_data_entry_form](#)

[redcap_data_entry_form_top](#)

[redcap_email](#)

[redcap_every_page_before_render](#)

[redcap_every_page_top](#)

[redcap_pdf](#)

[redcap_project_home_page](#)

[redcap_save_record](#)

[redcap_survey_acknowledgement_page](#)

[redcap_survey_complete](#)

[redcap_survey_page](#)

[redcap_survey_page_top](#)

[redcap_user_rights](#)

redcap_survey_page

(REDCap >= 5.11.0)

[redcap_survey_page](#) — Allows custom actions to be performed on a survey page

Description

```
void redcap_survey_page ( int $project_id, string $record = NULL, string $instrument, int $event_id, int $group_id = NULL, string $survey_hash, int $response_id = NULL, int $repeat_instance = 1 )
```

Allows custom actions to be performed on a survey page. You may utilize this hook to 1) perform back-end operations, such as adding or modifying data in database tables, which can be done when the page loads or when triggered by a user action on the page via JavaScript, or 2) output custom HTML, JavaScript, and/or CSS to modify the current page in any way desired.

NOTE: This hook function does not get executed after the survey is completed (i.e., on the Survey Acknowledgment page). If you wish to perform an action after the survey has been completed, you should use the `redcap_survey_complete()` hook function.

Location of Execution

The function is executed at the very BOTTOM of every survey page (after the survey has been rendered).

Developer methods for hooks and plugins (and EMs)

Developer methods for Plugins, Hooks, & External Modules

REDCap::addFileToField

REDCap::addFileToRepository

REDCap::allowProjects

REDCap::allowUsers

REDCap::copyFile

REDCap::deleteRecord

REDCap::email

REDCap::escapeHtml

REDCap::evaluateLogic

REDCap::filterHtml

REDCap::getCopyright

REDCap::getData

REDCap::getDataDictionary

REDCap::getEventIdFromUniqueEvent

REDCap::getEventNames

REDCap::getExportFieldNames

REDCap::getFieldNames

REDCap::getFieldType

REDCap::getFile

REDCap::getGroupNames

REDCap::getInstrumentNames

REDCap::getLogEventTable

REDCap::getFile

REDCap::getParticipantEmail

REDCap::getParticipantList

REDCap::getProjectTitle

REDCap::getProjectXML

REDCap::getRecordIdField

REDCap::getReport

REDCap::getSurveyLink

REDCap::getSurveyQueueLink

REDCap::getSurveyReturnCode

REDCap::getUserRights

REDCap::getUsers

REDCap::getValidFieldsByEvents

REDCap::isLongitudinal

REDCap::logEvent

REDCap::renameRecord

REDCap::reserveNewRecordId

REDCap::saveData

REDCap::storeFile

REDCap::versionCompare

REDCap::escapeHtml

(REDCap >= 5.11.0)

REDCap::escapeHtml — Escapes a string of text or HTML for outputting to a webpage

Description

```
string REDCap::escapeHtml ( string $string )
```

Escapes a string of text or HTML for outputting to a webpage. If the text being printed to the page is user input (i.e., was originally generated by a user), then it is highly recommended to escape it to prevent any possibility of Cross-site Scripting (XSS).

Parameters

string
Text string to be escaped.

Return Values

Returns the escaped string.

- Aims to solve all the problems of legacy Plugins and Hooks
- Can do all that plugins & the hook file do and more!
- Benefits:
 - **Isolation** and **Portability**: Self-contained modules that don't modify core code, ensuring stability and easy sharing across instances.
 - Enhanced Customization: Extensive customization options for UI, features, workflows, and external tool integration.
 - Seamless Integration: Modules integrate smoothly with existing projects, adding tabs, fields, and data interactions.
 - Version Compatibility: Modules designed to be compatible with different REDCap versions, allowing for easy updates.
 - Reusability and **Collaboration**: Encourages code sharing, reusability, and community-driven enhancements.
 - Security and Stability: Modules undergo review process for data protection and system integrity

- External modules provide a self-contained approach to extending REDCap's functionality.
- They operate independently of the core codebase, which means that modifications made within an external module do not directly impact the stability or functionality of the underlying REDCap installation.
- This isolation ensures that updates or changes to the REDCap system won't break or conflict with the module's functionality.
- It also allows for better maintenance and easier troubleshooting, as issues within a module can be addressed without affecting the entire REDCap installation.

- External modules are designed to be easily shared and deployed across different REDCap instances.
- This portability means that researchers and developers can create modules once and distribute them for use in multiple projects or by other institutions.
- The module can be packaged and installed in a straightforward manner, making it convenient to transport custom features, enhancements, or integrations between different REDCap environments.
- This portability also encourages collaboration and knowledge sharing within the REDCap community, as researchers can benefit from existing modules and build upon them to further customize their own projects.

- External Modules (EM) benefit from the **feedback** provided by the community of the REDCap Consortium.
- Vanderbilt and the REDCap Consortium **regularly assess** feedback, feature requests, and EMs to determine potential improvements to REDCap.
- If certain functionalities provided by EMs gain significant traction and are widely adopted, they may be considered for **inclusion** in the core REDCap codebase.
- Features and enhancements that prove valuable and align with the goals and principles of REDCap may be integrated into the core codebase, thus **benefiting all users of REDCap**.

- **REDCapRepo**

Repository of External Modules

The REDCap Repo is a centralized repository of curated External Modules that can be downloaded and installed in REDCap by a REDCap administrator. External Modules are add-on packages of software that can extend REDCap's current functionality, as well as provide customizations and enhancements for REDCap's existing behavior and appearance, either at the system level or project level. The modules provided here were created and submitted by software developers at various REDCap institutions around the world.

If you have created a module and wish to submit it to be listed in the REDCap Repo, please complete the [Module Submission Survey](#). Updated versions must also be submitted via the survey. New submissions must pass our [automated security scan](#) before they will be approved. Modules should also follow the [Module Review Guidelines \(PDF\)](#), or may be subject to removal from the Repo at any time.

You may search below for available modules. If you got to this site directly, you will be able to view information about each module, but you will not be able to download modules from this page unless you arrived here from the REDCap application and are a REDCap administrator. If you have questions or are experiencing issues, please contact redcap@vumc.org.

Disclaimer: The modules listed in the REDCap Repo have gone through a process of testing, validation, and curation by the Vanderbilt REDCap Team with help from trusted individuals in the REDCap Consortium. It should not be assumed that all modules are bug-free or perfect, so please be aware that the entire risk as to the quality and performance of the module as it is used in your REDCap installation is borne by the REDCap administrators who download and install the modules.

Show entries

| Module title and description | First Submitted | Most Recent Update | Downloads (Installs only - Excludes updates) |
|------------------------------|-----------------|--------------------|---|
|------------------------------|-----------------|--------------------|---|

- Accessible for everybody at: <https://redcap.vanderbilt.edu/consortium/modules/index.php>
- **276** entries as of May 22, 2023

Top 20 downloaded modules (by download count)

- 1-5

| | | | | |
|--|------------|------------|-------|---|
| Admin Dashboard (<i>admin_dash_v4.0.6</i>) View on GitHub View Stats <i>Description:</i> Provides a sortable table view of various reports on REDCap metadata (users, projects, etc). Includes a number of built-in reports as well as support for custom SQL queries. <i>Authors:</i> Joe Spring (University of Iowa) , Heath Davis , Chris Ortman | 2018-02-27 | 2022-06-08 | 1,600 | You must be a REDCap administrator logged in to REDCap to download modules. |
| Shazam (<i>shazam_v1.3.13</i>) View on GitHub View Stats <i>Description:</i> A module for applying REDCap inputs into tabular or other custom layouts for surveys and data entry forms <i>Authors:</i> Andy Martin (Stanford University) , Yongjae Lee , Jordan Schultz | 2018-01-18 | 2023-03-30 | 1,544 | You must be a REDCap administrator logged in to REDCap to download modules. |
| Email Alerts (<i>email_alerts_v2.4.9</i>) View on GitHub View Stats <i>Description:</i> Allows users to construct and send customized email alerts to one or more recipients, in which the emails are triggered when a form/survey is completed and optionally based on conditional logic. The user interface enables customized options such as rich text, data piping, and file attachments. <i>Author:</i> Eva Bascompte Moragas (Vanderbilt University Medical Center) | 2017-10-26 | 2023-05-16 | 1,248 | You must be a REDCap administrator logged in to REDCap to download modules. |
| Form Render Skip Logic (<i>form_render_skip_logic_v3.3.13</i>) View on GitHub View Stats <i>Description:</i> This module hides and shows instruments based on the values of REDCap form fields. Multiple control fields can be defined to control the display of non-overlapping sets of forms. <i>Authors:</i> Philip Chase (University of Florida - CTSI) , Taryn Stoffs , Kyle Chesney | 2017-12-08 | 2021-06-25 | 1,169 | You must be a REDCap administrator logged in to REDCap to download modules. |
| Multilingual (deprecated) (<i>multilingual_v1.9.8</i>) View on GitHub View Stats <i>Description:</i> This module does not work properly in newer PHP versions, and has been deprecated in favor of REDCap's built-in Multi-Language Management feature. Allow survey's and data entry forms to be translated into multiple languages. Add translations via the Online Designer. <i>Author:</i> Stephen Martin () | 2018-02-02 | 2020-05-06 | 1,093 | You must be a REDCap administrator logged in to REDCap to download modules. |

Examples of integrated modules

Email Alerts (email_alerts_v2.4.11)

[View on GitHub](#) [View Stats](#)

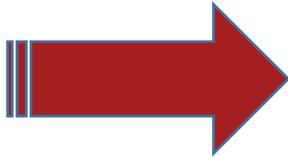
Description: Allows users to construct and send customized email alerts to one or more recipients, in which the emails are triggered when a form/survey is completed and optionally based on conditional logic. The user interface enables customized options such as rich text, data piping, and file attachments.

Author: [Eva Bascompte Moragas](#) (Vanderbilt University Medical Center)

2017-10-26

2023-05-23

1,248



Alerts & Notifications

The Alerts & Notifications feature allows you to construct alerts and send customized notifications. These notifications may be sent to one or more recipients and can be triggered or scheduled when a form/survey is saved and/or based on conditional logic whenever data is saved or imported. When adding/editing an alert, you will need to 1) set how the alert gets triggered, 2) define when the notification should be sent (including how many times), and 3) specify the recipient, sender, message text, and other settings for the notification. For the message, you may utilize customized options such as rich text, the piping of field variables (including Smart Variables), and uploading multiple file attachments. [Learn more](#)

My Alerts

Notification Log

Add New Alert

Re-evaluate Alerts

Upload or download Alerts

Show deactivated alerts

Examples of integrated modules

Form Render Skip Logic *(form_render_skip_logic_v3.3.13)*

[View on GitHub](#) [View Stats](#)

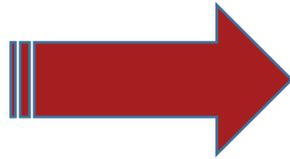
Description: This module hides and shows instruments based on the values of REDCap form fields. Multiple control fields can be defined to control the display of non-overlapping sets of forms.

Authors: [Philip Chase](#) (University of Florida - CTSI), [Taryn Stoffs](#), [Kyle Chesney](#)

2017-12-08

2021-06-25

1,169



Form Display Logic

Form Display Logic is an advanced feature that provides a way to use conditional logic to disable specific data entry forms that are displayed on the Record Status Dashboard, Record Home Page, or the form list on the left-hand menu. You might think of it as 'form-level branching logic'. Form Display Logic can be very useful if you wish to prevent users from entering data on a specific form or event until certain conditions have been met. The forms will still be displayed on the page, but they will be disabled in order to prevent users from accessing them. Below you may define as many conditions as you want. A form may be selected in multiple conditions, but if so, please note that the form will be enabled if at least one of the conditions is met. The Form Display Logic does not impact data imports but only operates in the data entry user interface to enable/disable forms. Additionally, Form Display Logic is not utilized by the Survey Queue at all but can affect the behavior of the Survey Auto-Continue feature if the checkbox for it is enabled below.

Optional Settings:

- Keep forms enabled if they contain data**
Only disable empty forms (those with a gray form status icon).
- Hide forms that are disabled**
All forms that are disabled will also be hidden (not visible) on the Data Collection menu and on the Record Home Page.

Condition 1:

Keep the following forms enabled...

- [All Events]
- Demographics [All Events]
- Baseline Data [All Events]
- Patient Morale Questionnaire [All Events]
- Visit Lab Data [All Events]
- Visit Blood Workup [All Events]
- Visit Observed Behavior [All Events]

...when the logic below is TRUE.

e.g., [enrollment_arm_1][age] > 30

[How to use this](#)

Not all make it, despite having widespread use

Multilingual (deprecated) (multilingual_v1.9.8)

[View on GitHub](#) [View Stats](#)

Description: This module does not work properly in newer PHP versions, and has been deprecated in favor of REDCap's built-in Multi-Language Management feature. Allow survey's and data entry forms to be translated into multiple languages. Add translations via the Online Designer.

2018-02-02

2020-05-06

1,093

Author: [Stephen Martin](#) ()

- Not fully compatible with REDCap 12+ or PHP 8+
- Abandoned by the developer
- Multi-language capability in REDCap core (v12+) was built based on another concept (which was also an external module, but it was never released to the public)

Top 20 downloaded modules

- 6-10

| | | | | |
|--|------------|-------------------|------------------|---|
| <p>MySQL Simple Admin (<i>mysql_simple_admin_v1.7</i>) View on GitHub View Stats</p> <p><i>Description:</i> A simple web-based MySQL client that is read-only and REDCap-centric. Adds a new link in the Control Center under 'Technical/Developer Tools'.</p> <p><i>Author:</i> Rob Taylor (Vanderbilt University Medical Center)</p> | 2017- | INTEGRATED | 54 | You must be a REDCap administrator logged in to REDCap to download modules. |
| <p>MyCap (<i>mycap_v1.15.7</i>) Private repository View Stats</p> <p><i>Description:</i> Companion module for MyCap (www.projectmycap.org)</p> <p><i>Author:</i> Jonathan Swafford (Vanderbilt University Medical Center)</p> | 2018-03-30 | 2022-11-28 | 1,020 | You must be a REDCap administrator logged in to REDCap to download modules. |
| <p>Image Map (<i>imagemap_v1.10.1</i>) View on GitHub View Stats</p> <p><i>Description:</i> This module replaces an input, radio, or checkbox field with an interactive image where users can click on image regions to select one or more field options. Find the complete documentation and an example instrument at https://github.com/ctsit/imagemap.</p> <p><i>Authors:</i> Andy Martin (Stanford University), Philip B. Chase</p> | 2018-01-31 | 2023-01-09 | 996 | You must be a REDCap administrator logged in to REDCap to download modules. |
| <p>Cross-Project Piping (<i>cross_project_piping_v1.5.0</i>) View on GitHub View Stats</p> <p><i>Description:</i> Cross-Project Piping pipes from one field in one project into another field in another project. The projects have to be MATCHED on a third field in both projects. Enable this module in the DESTINATION project and select appropriate fields in the configure panel.</p> <p><i>Author:</i> DataCore (Vanderbilt University Medical Center)</p> | 2019-02-28 | 2023-04-25 | 819 | You must be a REDCap administrator logged in to REDCap to download modules. |
| <p>Date Calculated Fields (<i>vanderbilt_datecalculatedfields_v1.7.1</i>) View on GitHub View Stats</p> <p><i>Description:</i> Allows for piping from date fields to other date fields, regardless of field type. Enables piping of data across events within a REDCap project.</p> <p><i>Author:</i> Ryan Moore (Vanderbilt University Medical Center)</p> | | INTEGRATED | @CALCDATE | You must be a REDCap administrator logged in to REDCap to download modules. |

Top 20 downloaded modules

- 11-15

| | | | | | |
|---|------------------------------------|------------|------------|-----|---|
| <p>Auto Populate Fields (<i>auto_populate_fields_v2.6.0</i>) View on GitHub View Stats</p> <p><i>Description:</i> Provides rich control of default values for data entry fields. These action tags allow fields to be populated based on values from other fields or static values. The fields can be read from the current event or the previous event in longitudinal projects.</p> <p><i>Author:</i> Tiago Bember Simeao (University of Florida - CTSI)</p> | <p>OBSOLETE</p> | 2017-12-15 | 2020-10-09 | 793 | You must be a REDCap administrator logged in to REDCap to download modules. |
| <p>Survey UI Tweaks (<i>survey_ui_tweaks_v1.2.2</i>) View on GitHub View Stats</p> <p><i>Description:</i> A collection of UI and quality of life enhancements to make surveys more aesthetically pleasing and user friendly</p> <p><i>Authors:</i> Andy Martin (Stanford University), Yongjae Lee, Ryan Valentine, Irvin Szeto, Ihab Zeedia</p> | <p>PARTIALLY INTEGRATED</p> | | | 763 | You must be a REDCap administrator logged in to REDCap to download modules. |
| <p>Auto DAGs (<i>auto_dags_v1.2.3</i>) View on GitHub View Stats</p> <p><i>Description:</i> Automatically creates, renames, and assigns records to Data Access Groups (DAGs) based on the value of a specified field. The value of that field becomes the name of the DAG. If the DAG already exists, then the record will be assigned to the existing DAG. An extra page is also provided for assigning the DAG for all records at once.</p> <p><i>Author:</i> Mark McEver (Vanderbilt University Medical Center)</p> | | 2017-10-24 | 2022-10-26 | 706 | You must be a REDCap administrator logged in to REDCap to download modules. |
| <p>Orca Search Module (<i>orca_search_v2.3.7</i>) View on GitHub View Stats</p> <p><i>Description:</i> A configurable, searchable, and performant, list dashboard</p> <p><i>Authors:</i> Chris Kadolph (Marshfield Clinic Research Institute), Leila Deering</p> | | 2018-05-14 | 2023-04-03 | 592 | You must be a REDCap administrator logged in to REDCap to download modules. |
| <p>Auto Record Generation (<i>vanderbilt_auto_record_generation_v1.7</i>) View on GitHub View Stats</p> <p><i>Description:</i> Module that allows for a new record to be generated in another project (or the same project) on a flagging field being saved. Allows for data fields to be transferred to the new record as well.</p> <p>Events and repeating instruments are NOT currently supported.</p> <p><i>Author:</i> Ryan Moore (Vanderbilt University Medical Center)</p> | | 2018-07-05 | 2021-08-09 | 578 | You must be a REDCap administrator logged in to REDCap to download modules. |

Top 20 downloaded modules

• 16-20

Tableau Web Data Connector *(tableau_connector_v2.2.6)*

[View on GitHub](#) [View Stats](#)

Description: From REDCap v11.2.0 this module's functionality is incorporated within REDCap. Go to your project's "Other Export Options" page for instructions.

This module enable Tableau (v10.0+) users to connect Tableau to a REDCap project for which they have an API token. Project data will be exported on demand and be available for use within Tableau to produce summaries and visualisations. (Note: The connector can be utilised without enabling this module for a particular project. Enabling this module for a project just makes the Instructions page available in the project page menu.)

Author: [Luke Stevens](#) (Murdoch Children's Research Institute)

2018-01-14

2021-10-05

554

You must be a REDCap administrator logged in to REDCap to download modules.

Instant Field Concatenation *(instant_field_concatenation_v1.2.2)*

[View on GitHub](#) [View Stats](#)

Description: This module concatenates fields and places the result in a JavaScript and not PHP. It happens upon the user leaving the field.

Author: [Scott J. Pearson](#) (Vanderbilt University Medical Center)

OBSOLETE

@CALCTEXT

528

You must be a REDCap administrator logged in to REDCap to download modules.

Big Data Import *(big_data_import_v1.15)*

[View on GitHub](#) [View Stats](#)

Description: This tool helps import one or more big CSV files without the need to split them.

Author: [Eva Bascompte Moragas](#) (Vanderbilt University Medical Center)

2019-07-15

2023-05-03

WILL BE INTEGRATED

Image Viewer *(image_viewer_v1.4.5)*

[View on GitHub](#) [View Stats](#)

Description: Preview uploaded images

Authors: [Andrew Martin](#) (Stanford University)

LARGELY OBSOLETE

@INLINE, @INLINE-PREVIEW, :inline

78

You must be a REDCap administrator logged in to REDCap to download modules.

Cross-Project Check for Duplicate Records *(cross_project_duplicate_check_v1.4)*

[View on GitHub](#) [View Stats](#)

Description: Checks for duplicate records (as defined by a certain number of matching fields) across one or more projects. If the field matches across multiple records, a duplicate is reported. (Does not currently work for repeating instruments/events.)

Author: [Scott J. Pearson](#) (Vanderbilt University Medical Center)

2017-10-26

2020-08-05

474

You must be a REDCap administrator logged in to REDCap to download modules.

- From EMs
 - Image Viewer (partial)
 - Inline Full (full screen toggle for inline images/PDFs) (partial)
 - Babel (unreleased) → Multi-Language Management
 - My Projects Tweaks
- Direct-to-core
 - Navigate to page
 - Re-display survey instructions
 - Filter widget for Database Query Tool tables, Action Tags, Smart Variables help
 - Other minor enhancements

EM vs building for core: Lessons learnt

- EMs are a fantastic (and quick and safe) way to try out things
- They can do virtually anything in the client
- They are (very) limited on the server with regard to REDCap processes
- For some features, it may be better to approach Vanderbilt regarding integration into REDCap core (sometimes, Vanderbilt will approach YOU)
- No limits – one can hook into any process
- Often, however, proper integration will be considerably more effort than providing an EM. This may pay off in the long run.

But what can External Modules actually do?

- Customized user interface elements
- Advanced data validation and quality checks
- Integration with external tools and systems
- Complex calculations and data transformations
- Customized reporting and data visualization
- Automation of data import/export processes
- Integration with external resources (databases, web services, ...)
- Additional security measures or user access controls
- Implementation of specialized data capture workflows

Example: Customized user interface element

- Stopwatch

3 Text Box, Number w/comma (elapsed time in seconds)

Action Tag:
@STOPWATCH={ "digits": 1, "resume": true }

- Limited to 1 decimal digit
- Timer can be resumed after a stop



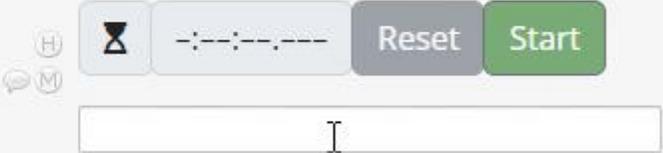
4 Text Box, Time (MM:SS)
Note: no hours or milliseconds, capped at 59:59

Action Tag:
@STOPWATCH



5 Text Box, no validation, text box shown

Action Tag:
@STOPWATCH={ "show_target": true }



6 Text Box, integer, user blinded to the result

Elapsed time: _____

Action Tag:
@STOPWATCH={
 "display_format": "Blinded",
 "display_running": "Running",
 "display_empty": "--:--:--"
}



Example: Additional “security” measures

- nedCAPTCHA (no external dependencies like reCAPTCHA)

MARIEN HOSPITAL HERNE 
UK RUB UNIVERSITÄTSKLINIKUM DER
RUHR-UNIVERSITÄT BOCHUM

Kontaktformular

Bevor Sie zum Kontaktformular gelangen, müssen Sie mittels folgendem CAPTCHA beweisen, dass Sie keine Maschine sind. Bitte haben Sie dafür Verständnis. Vielen Dank!

Bitte geben Sie den Text exakt wie angezeigt ein.



Powered by REDCap

Marien Hospital Herne - Universitätsklinikum der Ruhr-Universität Bochum
Impressum | Datenschutz

Example: Data entry enhancements

- Autofill / Autotab

Editing existing Record ID 1.

Record ID: 1

Autotab: [dropdown] [dropdown] [dropdown]

Before **Autofill** Reset after

Text box

EMDT - text

```
@AUFILL-VALUE="Some text"
@AUFILL-VALUE={
  "value": "Some alternative text",
  "group": "2",
  "overwrite": true
}
```

Text box - overwrite!

EMDT - overwritten

```
@DEFAULT="Default value"
@AUFILL-VALUE={
  "value": "Overridden value!",
  "overwrite": true
}
```

Notes Box

EMDT - notes

```
@AUFILL-VALUE="Some
extended
text
spanning
multiple
lines"
```

Date

EMDT - date

```
@AUFILL-VALUE="22-02-2020"
```

Could be helpful here ;) →

These were screen captures showing auto-filling of fields with preset default values and auto-tabling to the next input after selecting in a dropdown by a keypress.

Ödem Wirbelsäule - 0 = kein Ödem, 1 = KMO ≤ 25%, 2 = KMO ≤ 50%, 3 = KMO > 50% des Wk, A = Artefakt

| | | | | | | | | | | | |
|------|------|-------|--------|--------|--------|------|------|------|------|-------|------|
| C2/3 | C3/4 | C4/5 | C5/6 | C6/7 | C7/T1 | T1/2 | T2/3 | T3/4 | T4/5 | T5/6 | T6/7 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| T7/8 | T8/9 | T9/10 | T10/11 | T11/12 | T12/L1 | L1/2 | L2/3 | L3/4 | L4/5 | L5/S1 | |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |

Fettdegeneration(en) - 0 = nicht vorhanden, 1-4 = Fettdegeneration in 1-4 Quadranten pro WE, A = Artefakt

| | | | | | | | | | | | |
|------|------|-------|--------|--------|--------|------|------|------|------|-------|------|
| C2/3 | C3/4 | C4/5 | C5/6 | C6/7 | C7/T1 | T1/2 | T2/3 | T3/4 | T4/5 | T5/6 | T6/7 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| T7/8 | T8/9 | T9/10 | T10/11 | T11/12 | T12/L1 | L1/2 | L2/3 | L3/4 | L4/5 | L5/S1 | |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |

Erosion(en) - 0 = nicht vorhanden, 1 = vorhanden

| | | | | | | | | | | | |
|------|------|-------|--------|--------|--------|------|------|------|------|-------|------|
| C2/3 | C3/4 | C4/5 | C5/6 | C6/7 | C7/T1 | T1/2 | T2/3 | T3/4 | T4/5 | T5/6 | T6/7 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| T7/8 | T8/9 | T9/10 | T10/11 | T11/12 | T12/L1 | L1/2 | L2/3 | L3/4 | L4/5 | L5/S1 | |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |

Sklerose(n) - 0 = nicht vorhanden, 1 = vorhanden

| | | | | | | | | | | | |
|------|------|-------|--------|--------|--------|------|------|------|------|-------|------|
| C2/3 | C3/4 | C4/5 | C5/6 | C6/7 | C7/T1 | T1/2 | T2/3 | T3/4 | T4/5 | T5/6 | T6/7 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| T7/8 | T8/9 | T9/10 | T10/11 | T11/12 | T12/L1 | L1/2 | L2/3 | L3/4 | L4/5 | L5/S1 | |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |

Modic - 0 = Normalbefund, 1 = Modic I Läsion, 2 = Modic II Läsion, 3 = Modic III Läsion

| | | | | | | | | | | | |
|------|------|-------|--------|--------|--------|------|------|------|------|-------|------|
| C2/3 | C3/4 | C4/5 | C5/6 | C6/7 | C7/T1 | T1/2 | T2/3 | T3/4 | T4/5 | T5/6 | T6/7 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| T7/8 | T8/9 | T9/10 | T10/11 | T11/12 | T12/L1 | L1/2 | L2/3 | L3/4 | L4/5 | L5/S1 | |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |

Pfirschmann - 1-5 = Pfirschmann Grade 1 bis 5

| | | | | | | | | | | | |
|------|------|-------|--------|--------|--------|------|------|------|------|-------|------|
| C2/3 | C3/4 | C4/5 | C5/6 | C6/7 | C7/T1 | T1/2 | T2/3 | T3/4 | T4/5 | T5/6 | T6/7 |
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| T7/8 | T8/9 | T9/10 | T10/11 | T11/12 | T12/L1 | L1/2 | L2/3 | L3/4 | L4/5 | L5/S1 | |
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | |

Example: Productivity enhancements for developers

- EM Developer Tools / Admin Insights
 - Inject useful information such as action tags
 - Reveal hidden forms
 - Remove @READONLY
 - Shortcuts

Text box - overwrite!

```
AI - overwritten
@DEFAULT="Default value"
@AUTOFILL-VALUE={
  "value": "Overridden value!",
  "overwrite": true
}
```

```
-----
"clearLabel": "start fresh",
"clearStyle": "margin:5px;",
"delimiter": "<br />"
}
```

Widget for all:

```
AI - widget_survey
@HIDDEN-FORM
@AUTOFILL-SURVEY={
  "groups": [ "", "2"],
  "autofillLabel": "Easy Survey Fill"
}
```

Record Home Page

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.

Choose action for record

- Download PDF of record data for all instruments
- Download PDF of record data for all instruments (compact)
- Lock entire record
- Rename record
- Delete record (all forms)
- AI Logging
- AI Query Data in Database Query Tool
- AI Query Logs in Database Query Tool

Auto-fill form

AI Reveal hidden (1)

Example: Plugin page

- Admin Dashboard

The screenshot shows the REDCap Admin Dashboard interface. At the top, there is a navigation bar with the REDCap logo, a search box for PID, and links for Home, My Projects, New Project, Send-It, Messenger, and Control Center. On the right, it shows the user is logged in as 'gr' with links for Profile and Log out. A red 'DEVELOPMENT' banner is visible in the top right corner.

Admin Dashboard

Smart Reports | Projects by User | Users by Project | Research Projects | Development Projects

All Projects | **Projects with External Modules**

Show/Hide Columns | Export: Copy CSV JSON

🔌 Projects with External Modules

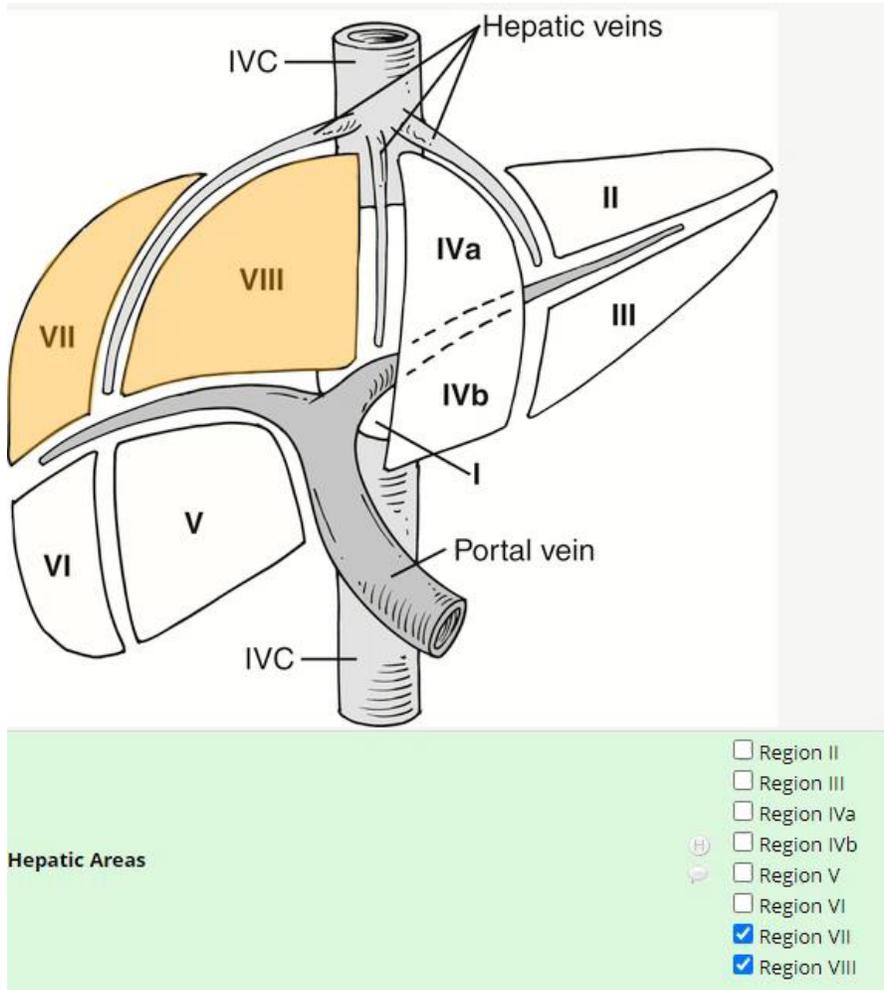
List of External Modules and the projects they are enabled in.

Show: entries

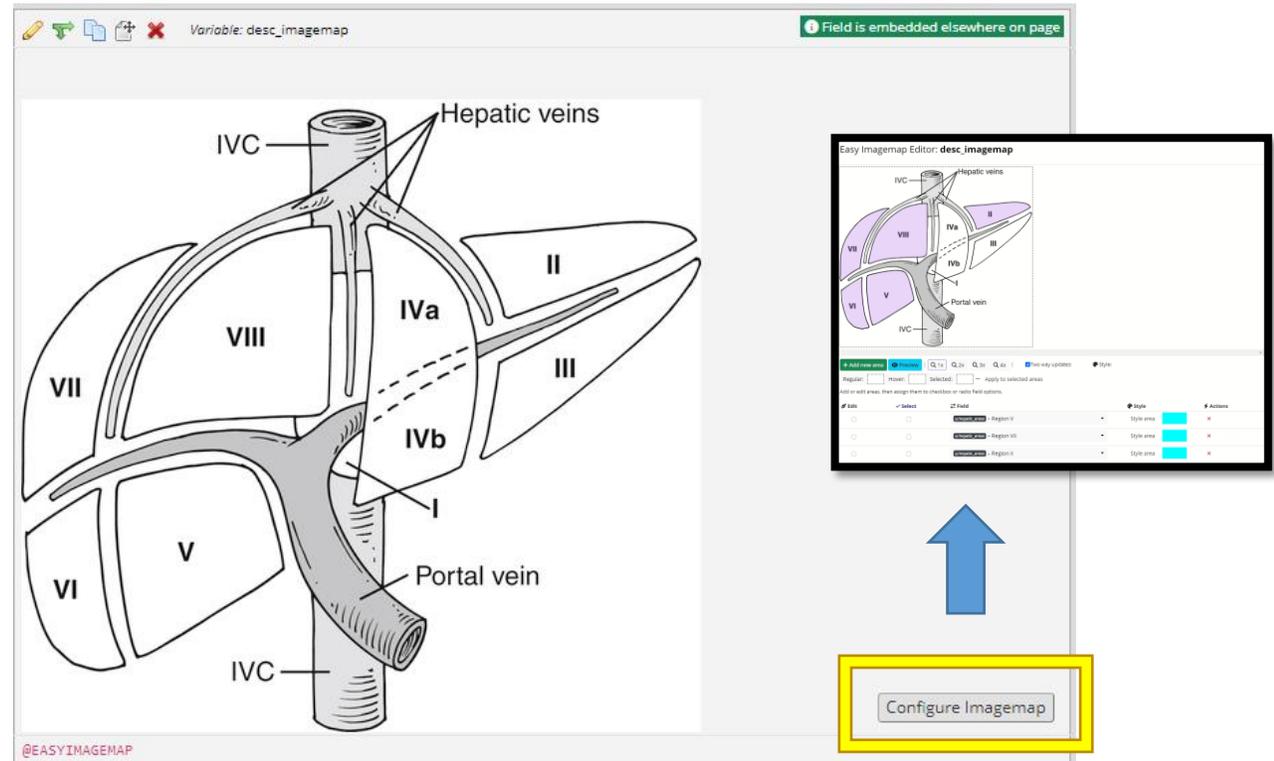
Search:

| Module Name | Project Titles | User Emails (from enabled projects) | Total Projects |
|------------------|------------------------------------|--|----------------|
| | | | |
| actiontag_parser | 🔌 TEST - Action Tag Parser | guenther.rezniczek@rub.de | 1 |
| admin_dash | 🔌 Admin Dashboard | guenther.rezniczek@rub.de | 1 |
| babel | 🔌 Test - Babel EM | guenther.rezniczek@rub.de | 1 |
| dummy_module | 🔌 TEST - Multi-Language Management | guenther.rezniczek@rub.de test@test.com | 1 |
| dymo_labels | 🔌 TEST - DYMO Labels | guenther.rezniczek@rub.de | 1 |
| emm_tools | 🔌 EM UI Trimmer | guenther.rezniczek@rub.de test@test.com | 1 |
| imagemap | 🔌 EM ImageMap | guenther.rezniczek@rub.de | 1 |

Example: Custom image map with designer



Online Designer integration:

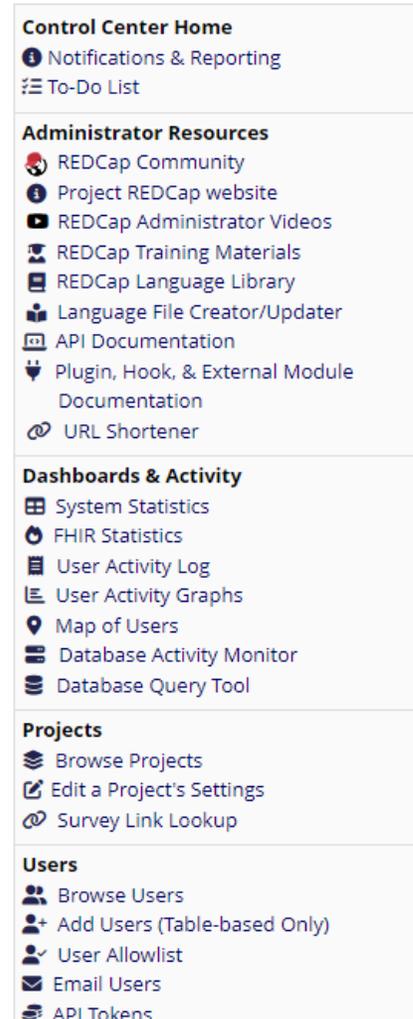


PDF note: This would show a screen capture of setting up a new area by drawing in the designer.

Administration – Control Center

- Manage modules (install, activate, change version) with a few clicks
- View usage in projects
- Access logs

Control Center menu:



[Return to project 115](#) EMDT

External Modules - Module Manager

[Set custom text for Project Module Manager page](#)

External Modules are individual packages of software that can be downloaded and installed by a REDCap administrator. Modules can extend REDCap's current functionality, and can also provide customizations and enhancements for REDCap's existing behavior and appearance at the system level or project level.

You may click the 'View modules' button below to navigate to the REDCap Repo (Repository of External Modules), which is a centralized catalog of curated modules that have been submitted by various REDCap partner institutions. If you find a module in the repository that you wish to download, you will be able to install it, enable it, and then set any configuration settings (if applicable). If you choose not to enable the module in all REDCap projects by default, then you will need to navigate to the External Modules page on the left-hand menu of a given project to enable it there for that project. Some project-level configuration settings, depending on the module, may also need to be set on the project page.

Developer Tools

- [Module Security Scanning](#)
- [Run Module Framework JavaScript Unit Tests](#)

NOTICE: It has been detected that you have a development version of the External Module framework installed at `/home/gr/redcap/external_modules/`. As such, please note that REDCap will use that version of the framework rather than the one bundled in this REDCap version.

[Enable a module](#)

[View modules available in the REDCap Repo](#)

[Configure Cron Start Times](#)

[Return to project 115](#) EMDT

Modules Currently Available on this System

Action Tag Parser - Demo - v9.9.9

An external module demonstrating an improved action tag parser.
by Günther Reznicek (Ruhr-Universität Bochum)

[View Documentation](#)

[Query in Database Query Tool](#) EMDT

[Purge system settings](#) EMDT

[Configure+](#)

[Configure](#)

[Disable](#)

[View](#)

[Usage](#)

- Management page

External Modules - Project Module Manager

External Modules are individual packages of software that can be downloaded and installed by a REDCap administrator. Modules can extend REDCap's current functionality, and can also provide customizations and enhancements for REDCap's existing behavior and appear on the system level or project level.

As a REDCap administrator, you may enable any module that has been installed in REDCap for this project. Some configuration settings might be required to be set, in which administrators or users in this project with Project Setup/Design privileges can modify the configuration of any module at any time after the module has first been enabled by an administrator. Note: Normal project users will not be able to enable or disable modules.

DISCLAIMER: Please be aware that External Modules are not part of the REDCap software but instead are add-on packages that, in most cases, have been created by software developers at other REDCap institutions. Be aware that the entire risk as to the quality and performance of the module as it is used in your REDCap project is borne by you and your local REDCap administrator. If you experience any issues with a module, your REDCap administrator should contact the author of that particular module.

[+ Enable a module](#) [Export Module Settings](#) [Import Module Settings](#)

Currently Enabled Modules

Admin Insights - v9.9.9 Enabled for All Projects

An external module giving some insights into projects.

[View Documentation](#)

[Configure](#)[Disable](#)

Custom Footer - v9.9.9 Enabled for All Projects

Allows admins and project admins to add a custom footer to survey and project pages. Depending on system settings, project admins may not be able to configure or disable this module. [See full documentation here.](#)

[View Documentation](#)

[Configure](#)[Disable](#)

Field Shuffle - v9.9.9

A REDCap External Module that puts fields into a random order.

[View Documentation](#)

[Configure](#)[Disable](#)

Modify Contact Admin Button - v9.9.9 Enabled for All Projects

Modify the behavior of the 'Contact REDCap Administrator' button by redirecting the user to a configurable url. The REDCap admin can set this URL in the external module configuration. See the complete [documentation](#) at https://github.com/ctsit/modify_contact_admin_button.

[View Documentation](#)

[Configure](#)[Disable](#)

Multiple - v9.9.9 Enabled for All Projects

Adds multi-record/instance editing capabilities to REDCap. [See full documentation here.](#)

[View Documentation](#)

[Configure](#)[Disable](#)

Administration: Projects

- Management page
- Module configuration

Configure Module: REDCap JavaScript Injector

Project: EM JavaScript Injector

Settings

Values

Hide this module from non-admins in the list of enabled modules on this project:

1. JavaScript Snippet:

1. Name (optional):

1. Enabled:

1. Add the JavascriptModuleObject:

1. The JavascriptModuleObject (JSMO) is accesible at `ExternalModules.DE.RUB.JSInjectorExternalModule`.

1. Enable debug logging:

1. Debug logging outputs information useful for troubleshooting to the console

1. JavaScript Code (without `<script>` tags):

```
console.log("Project Home Page");
```

1. Apply and/or limit to these project pages:

1. All project pages:

1. Project Home Page:

1. Record Status Dashboard:

1. Add / Edit Records:

1. Record Home Page:

Always on

Not set (on if all is on)

Not set (on if all is on)

Not set (on if all is on)

- **Architecture:** The EM Framework operates within the existing REDCap architecture, utilizing a modular approach. Modules interact with REDCap through defined hooks and APIs.
- **Hooks:** Hooks are predefined entry points in REDCap's code where external modules can inject custom code. This enables modules to modify and extend the behavior of REDCap at specific points in the application flow.
- **APIs:** The EM Framework provides a set of APIs that allow modules to interact with REDCap's functionality and data.
- **Module Configuration:** Each external module has its own configuration file that specifies its properties, dependencies, and settings.

REDCap External Module Framework Documentation

You've reached the official documentation for REDCap's External Module Framework. If you're new to External Module development, [University of Florida's Development Guide](#) is a great starting point. We are considering merging part 4 of this guide directly into this repo to ensure it automatically stays up to date over time as framework changes are made.

These docs and the External Module Framework itself are both very much a community effort. If/when you notice room for improvement, feel free to [create an issue](#). It is also highly encouraged to [fork this repo](#), make any changes you desire, then go to the `Pull Requests` tab from your fork and select `New pull request`.

| Development Resources | Descriptions |
|---|---|
| General Documentation | Technical details relating to many aspects of module development |
| Method & Hook Documentation | The list of all methods & hooks available to use within module code |
| Framework Versioning | The mechanism through which backward compatibility is maintained as the framework changes over time |
| Internationalization Guide | The guide for support multiple languages within your module |

- Methods on the framework object
- Plus several additional more focused objects
 - Project
 - Form
 - User

| Method | Minimum REDCap Version | Description |
|--|------------------------|--|
| <code>addAutoNumberedRecord([\$pid])</code> | 8.0.0 | Creates the next auto numbered record and returns the record id. If the optional PID parameter is not specified, the current PID will be automatically detected. |
| <code>compareGetDataImplementations(...)</code> | 10.8.2 | BETA: Compares <code>REDCap::getData()</code> and <code>\$module->getData()</code> results. See this page for details. |
| <code>convertIntsToStrings(\$row)</code> | 9.7.6 | Returns a copy of the specified array with any integer values cast to strings. This method is intended to aid in converting queries to use parameters with minimal refactoring. |
| <code>countLogs(\$whereClause, \$parameters)</code> | 9.9.1 | Returns the count of log statements matching the specified where clause. Example: <code>countLogs("message = ? and timestamp > ?", [\$message, \$dateTimeObject])</code> |
| <code>createDAG(\$name)</code> | 8.0.0 | Creates a DAG with the specified name, and returns it's ID. |
| <code>createPassthruForm(\$projectId, \$recordId, // optional \$surveyFormName, \$eventId)</code> | 8.11.8 | Outputs the HTML for opening/continuing the survey submission for the specified record. If a return code is required, a link is returned. Otherwise, a self submitting form is returned. |
| <code>createProject(\$title, \$purpose, [, \$projectNote])</code> | 9.7.6 | Creates a new redcap project and returns the project id. |
| <code>createQuery()</code> | 9.7.8 | Creates a <code>Query</code> object to aid in building complex queries using parameters. See the Query Documentation page for more details. |

EM Framework Hooks

- All REDCap Hooks are supported plus a few extra

Hooks provided by External Modules

There are a few extra hooks dedicated for modules use:

| Method | Minimum REDCap Version | Description |
|--|------------------------|---|
| <code>redcap_module_ajax(\$action, \$payload, \$project_id, \$record, \$instrument, \$event_id, \$repeat_instance, \$survey_hash, \$response_id, \$survey_queue_hash, \$page, \$page_full, \$user_id, \$group_id)</code> | 12.5.9 | Triggered by calling the <code>ajax()</code> method of the <i>Javascript Module Object</i> . <code>\$action</code> (must be a string) and <code>\$payload</code> are the parameters submitted to <code>module.ajax()</code> ; the other parameters give context information that, when set, can be trusted to be correct (as with REDCap hooks). Allowed actions (in authenticated and non-authenticated contexts) must be explicitly declared in <code>config.json</code> through the <code>auth-ajax-actions</code> and <code>no-auth-ajax-actions</code> settings (arrays of strings), respectively. |
| <code>redcap_module_configuration_settings(\$project_id, \$settings)</code> | 11.0.0 | Triggered when the system or project configuration dialog is displayed for a given module. This hook allows modules to dynamically modify and return the settings that will be displayed. |
| <code>redcap_module_system_enable(\$version)</code> | 9.0.0 | Triggered when a module is enabled or changed to a different version in Control Center. It is not recommended to use this hook as a primary means of determining when to transition modified module settings, as there are many edge cases that could conflict with such logic (e.g. temporarily downgrading a module). It is instead recommended to transition settings based solely on the state of the values currently stored. |
| <code>redcap_module_system_disable(\$version)</code> | 9.0.0 | Triggered when a module gets disabled on Control Center. |
| <code>redcap_module_system_change_version(\$version,</code> | | This hook is no longer used. Since REDCap 12.0.4 the |

EM Framework JavaScript Module Object

- Provides a number of methods for use in JavaScript code on the client
- Must be initialized on demand

| Method | Minimum REDCap Version | Description |
|------------------------------|------------------------|--|
| afterRender(action) | 12.2.10 | Accepts a function to be called after the page has finished rendering AND if/when it is re-rendered when switching languages using the Multi-Language Management feature. Please make sure it is safe to call the given <code>action</code> multiple times. This method could be expanded in the future to handle other scenarios where the page is re-rendered. Actions can be registered at any time, even before the DOM is ready, but will be called the earliest when the DOM is ready. |
| ajax(action, data) | 12.5.9 | Performs a server request (POST) with the string <code>action</code> and the payload <code>data</code> (any type) and returns a <code>Promise</code> . Response and errors can then be acted upon in its <code>.then</code> and <code>.catch</code> methods (see example above). The module must implement the <code>redcap_module_ajax</code> hook to process the request. |
| getUrl(path, noAuth = false) | 11.2.3 | Works similarly to the PHP method with the same name, except that API endpoints are always returned. |
| getUrlParameter(name) | 8.11.10 | Returns the value for the specified GET/URL parameter. |
| getUrlParameters() | 8.11.10 | Returns an object containing all GET parameters for the current URL. |
| isImportPage() | 8.11.10 | Returns true if the current page is a Data Import Tool page. |
| isImportReviewPage() | 8.11.10 | Returns true if the current page is the Data Import Tool review page. |
| isImportSuccessPage() | 8.11.10 | Returns true if the current page is the Data Import Tool success page. |
| isRoute(routeName) | 8.11.10 | See the description for the PHP version of this method (above). |
| log(message[, parameters]) | 8.11.10 | See the description for the PHP version of this method (above). The requirement for allow lists or other input validation for user sourced data is even more important in this context. The <code>enable-ajax-logging</code> flag must be set to <code>true</code> in <code>config.json</code> to enable this method. In a non-authenticated context, the <code>enable-no-auth-logging</code> flag must also be set to <code>true</code> for all framework versions. From framework version 11 on, a promise is returned that resolves to the ID of the log added. |
| tt(key[, value[, ...]]) | 9.5.0 | Returns the string identified by <code>key</code> from the language store, optionally interpolated with the values passed as additional arguments (if the first such value is an array or object, its elements/members are used for interpolation and any further arguments are ignored). Refer to the internationalization guide for more details. |
| tt_add(key, item) | 9.5.0 | Adds a (new) item (typically a string), identified by <code>key</code> , to the language store of the <i>JavaScript Module Object</i> . If an entry with the same name already exists in the store, it will be overwritten. |

How to create your own modules

- Set up a development environment
 - Good guide to get you set up: “Building a REDCap Development Environment”
 - https://ctsit.github.io/redcap_external_module_development_guide/emd101
- If you are “only” a developer: familiarize yourself with REDCap
 - “A tour through REDCap as an Admin”
 - https://ctsit.github.io/redcap_external_module_development_guide/emd102
- Then,
 - Add a config.json file and a module class that extends AbstractExternalModule
 - Or use the External Module Templater to get you started

Building a development environment

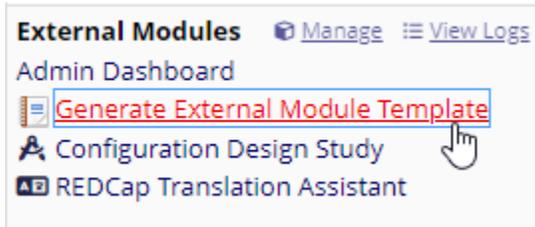
- Local webserver (PHP, MySQL)
- Xdebug
- Don't even try to get serious with having email capability (MailHog)
- Docker or not Docker
- Capable editor (VS Code, PhpStorm)

- Useful external modules
 - EMDT (External Module Developer Tools) and/or
 - Admin Insights (available soon)

I personally use:

- Apache/PHP/MySQL on
- Debian, running inside
- WSL2 (Windows)
- Visual Studio Code
 - PHP Debug, PHP Intellephense, JavaScript Debugger
- Chrome (Dev Tools)

External Module Templater EM*



- Gathers some information
 - Hooks to use
 - Links (plugin pages)
 - Crons

then

- Scaffolds a template

Configure New REDCap External Module

Module

Class Name *
This will be the name of the actual PHP class that holds business logic as well as the .php file that contains the class definition

Namespace *
Final sub-namespace must be the module's class name (e.g., **MyOrgName\NotMyModule** is not allowed)
Multiple namespaces allowed (e.g., **MyOrgName\MyTeam\MyModule**)

Description *

Initial Version
Must be in format X.X.X or X.X where X is any integer from 0 to 100

Directory Name
Should match pattern [any_unique_snake_case_name]_v[INITIAL_VERSION]
You can search the [REDCap Repo](#) to ensure your name will be unique

Authors

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Author Name *

Email Address

Organization

- Brand new home of the EM Framework docs:
<https://github.com/vanderbilt-redcap/external-module-framework-docs>
- Inside REDCap
 - Control Center > API Documentation, Project > API Playground
 - Control Center > Plugin, Hook, & External Module Documentation
- REDCap Training Materials Repository:
https://redcap.vanderbilt.edu/plugins/redcap_consortium/training_materials.php
- External Module Developer Guide (maintained by **CTS-IT**, University of Florida):
https://ctsit.github.io/redcap_external_module_development_guide/

Step 1: Modules extend AbstractExternalModule

- Thereby getting access to the API

1) Module class

Each module must define a module class that extends `ExternalModules\AbstractExternalModule` (see the example below). Your module class is the central PHP file that will run all the business logic for the module. You may have many other PHP files (classes or include files), as well as JavaScript, CSS, etc. All other such files are optional, but the module class itself is necessary and drives the module.

```
<?php
// Set the namespace defined in your config file
namespace MyModuleNamespace\MyModuleClass;

// Declare your module class, which must extend AbstractExternalModule
class MyModuleClass extends \ExternalModules\AbstractExternalModule {
    // Your module methods, constants, etc. go here
}
```

Step 2: Provide a configuration file

Here's an example of the minimum requirements for `config.json` :

```
{
  "name": "Example Module",
  "namespace": "MyModuleNamespace\\MyModuleClass",
  "description": "This is a description of the module, and will be displayed below the module name in the user interface.",
  "framework-version": 10,
  "authors": [
    {
      "name": "Jon Snow",
      "email": "jon.snow@vumc.org",
      "institution": "Vanderbilt University Medical Center"
    }
  ]
}
```

Step 3: Place the files in the proper (ly named) place

Naming a module

Modules must follow a specific naming scheme for the module directory that will sit on the REDCap web server. Each version of a module will have its own directory (like REDCap) and will be located in the `/redcap/modules/` directory on the server. A module directory name consists of three parts:

1. A **unique name** (so that it will not duplicate any one else's module in the consortium) in **snake case** format
2. `"_v"` (an underscore followed by the letter "v")
3. A **module version number**. **Semantic Versioning** is recommended (e.g. `1.2.3`), although simpler `#. #` versioning is also supported (e.g. `1.2`).

The diagram below shows the general directory structure of some hypothetical modules to illustrate how modules will sit on the REDCap web server alongside other REDCap files and directories.

```
redcap
|-- modules
|   |-- my_module_name_v1.0.0
|   |-- other_module_v2.9
|   |-- other_module_v2.10
|   |-- other_module_v2.11
|   |-- yet_another_module_v1.5.3
|-- redcap_vX.X.X
|-- redcap_connect.php
|-- ...
```



Step 4: Activate your module

External Modules - Module Manager

Set custom text for Project Module Manager page

External Modules are individual packages of software that can be downloaded and installed by a REDCap administrator. Modules can extend REDCap's current functionality, and can also provide customizations and enhancements for REDCap's existing behavior and appearance at the system level or project level.

You may click the 'View modules' button below to navigate to the REDCap Repo (Repository of External Modules), which is a centralized catalog of curated modules that have been submitted by various REDCap partner institutions. If you find a module in the repository that you wish to download, you will be able to install it, enable it, and then set any configuration settings (if applicable). If you choose not to enable the module in all REDCap projects by default, then you will need to navigate to the External Modules page on the left-hand menu of a given project to enable it there for that project. Some project-level configuration settings, depending on the module, may also need to set on the project page.

Developer Tools

- [Module Security Scanning](#)
- [Run Module Framework JavaScript Unit Tests](#)

NOTICE: It has been detected that you have a development version of the External Module framework installed at `/home/gr/redcap/external_modules/`. As such, please note that REDCap will use that version of the framework rather than the one bundled in this REDCap version.

[Enable a module](#) [View modules available in the REDCap Repo](#) [Configure Cron Start Times](#)

Available Modules

| | | |
|---|---------|--|
| HIDESUBMIT Action Tags (Current version: v3.0.5) | v3.0.4 | Change Version Delete Version |
| Image Map (Not enabled) | v1.10.1 | Enable Delete Version |
| Custom Record Auto-numbering (Current version: v1.0.6) | v1.0.5 | Change Version Delete Version |
| Record Home Dashboard (Current version: v2.1.0) | v2.0.2 | Change Version Delete Version |
| REDCap JavaScript Injector (Current version: v9.9.9) | v1.1.4 | Change Version Delete Version |

How to call REDCap Hooks

One of the more powerful things that modules can do is to utilize REDCap Hooks, which allow you to execute PHP code in specific places in REDCap. For general information on REDCap hook functions, see the hook documentation. To use a hook in your module you must **add a method in your module class with the exact same name as the name of the desired hook function**. For example, in the HideHomePageEmails class below, there is a method named `redcap_data_entry_form`, which means that when REDCap calls this hook, it will execute the module's implementation in this method.

```
<?php
namespace Vanderbilt\HideHomePageEmails;

class HideHomePageEmails extends \ExternalModules\AbstractExternalModule
{
    // This method will be called by the redcap_data_entry_form hook
    function redcap_data_entry_form($project_id, $record, $instrument, $event_id, $group_id, $repeat_instance)
    {
        // Put your code here to get executed by the hook
    }
}
```

Add plugin (standalone) pages via links

Add a link on the project menu to your plugin: Adding a page to your module is fairly easy. First, it requires adding an item to the `links` option in the `config.json` file. In order for the plugin link to show up in a project where the module is enabled, put the link settings (name, icon, and url) under the `project` sub-option, as seen below, in which `url` notes that `index.php` in the module directory will be the endpoint of the URL, "VoteCap" will be the link text displayed. See the `Config.json` section above for details on the `icon` parameter. You may add as many links as you wish. By default, project links will only display for superusers and users with design rights, but this can be customized in each module (see the `redcap_module_link_check_display()` documentation above).

```
{
  "links": {
    "project": [
      {
        "name": "VoteCap",
        "key": "votecap",
        "icon": "fas fa-receipt",
        "url": "index.php",
        "show-header-and-footer": true
      }
    ]
  }
}
```

```
{
  "links": {
    "project": [
      {
        "name": "VoteCap",
        "key": "votecap",
        "icon": "fas fa-receipt",
        "url": "index.php"
      }
    ],
    "control-center": [
      {
        "name": "VoteCap System Config",
        "key": "config",
        "icon": "fas fa-receipt",
        "url": "config.php"
      }
    ]
  }
}
```

Or for Control Center:

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```
<?php
```

```
// A $module variable will automatically be available and set to an instance of your module.
// It can be used like so:
$value = $module->getProjectSetting('my-project-setting');
// More things to do here, if you wish
```

```
"show-header-and-footer": true
```

```
],
"control-center": [
  {
    "name": "VoteCap System Config",
    "key": "config",
    "icon": "fas fa-receipt",
    "url": "config.php"
  }
]
}
```

Or for Control Center:

Communication back to the server from JavaScript

Making requests from JavaScript to modules

The External Module framework provides the `ajax()` method on the *Javascript Module Object* (see [documentation](#)), which can be used to make server requests to the module. The module must process the request in the `redcap_module_ajax` hook and (optionally) return a response (see [documentation](#)).

```
module.ajax('action', payload).then(function(response) {  
    // Process response  
}).catch(function(err) {  
    // Handle error  
});
```

Actions must be declared in `config.json`, separately for authenticated (a user is logged in) and non-authenticated (surveys and other contexts where no user is logged in) contexts.

```
"auth-ajax-actions": [ "action1", "action2" ],
```

```
"no-auth-ajax-actions": [ "action2" ],
```

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```
module.ajax('action', payload).then(function(response) {  
    // Process response  
}).catch(function(err) {  
    // Handle error  
});
```

Actions must be declared in `config.json` where no user is logged in.

```
"auth-ajax-actions": [
```

```
"no-auth-ajax-actions": [
```

| Method | Minimum REDCap Version | Description |
|--|------------------------|---|
| <code>redcap_module_ajax(\$action, \$payload, \$project_id, \$record, \$instrument, \$event_id, \$repeat_instance, \$survey_hash, \$response_id, \$survey_queue_hash, \$page, \$page_full, \$user_id, \$group_id)</code> | 12.5.9 | Triggered by calling the <code>ajax()</code> method of the <i>Javascript Module Object</i> . <code>\$action</code> (must be a string) and <code>\$payload</code> are the parameters submitted to <code>module.ajax()</code> ; the other parameters give context information that, when set, can be trusted to be correct (as with REDCap hooks). Allowed actions (in authenticated and non-authenticated contexts) must be explicitly declared in <code>config.json</code> through the <code>auth-ajax-actions</code> and <code>no-auth-ajax-actions</code> settings (arrays of strings), respectively. |

Implement cron jobs

Cron Configuration Examples

```
{
  "crons": [
    {
      "cron_name": "cron1",
      "cron_description": "Cron that runs every 30 minutes to do X",
      "method": "cron1",
      "cron_frequency": "1800",
      "cron_max_run_time": "86400"
    },
    {
      "cron_name": "cron2",
      "cron_description": "Cron that runs daily to do YY",
      "method": "some_other_method",
      "cron_frequency": "86400",
      "cron_max_run_time": "172800"
    }
  ]
}
```

```
/**
 * @param array $cronAttributes A copy of the cron's configuration block from config.json.
 */
function myCronMethodName($cronAttributes){
    // ...
}
```

Modifying REDCap pages – Caveats

- With the advent of Multi-Language Management (REDCap 12), data entry and survey pages may be changing in certain places (labels, etc.)
- If your module changes or interacts with these page elements, make sure to hook into the **afterRender()** callback of the JavaScriptModuleObject.

| Method | Minimum REDCap Version | Description |
|---------------------|------------------------|--|
| afterRender(action) | 12.2.10 | Accepts a function to be called after the page has finished rendering AND if/when it is re-rendered when switching languages using the Multi-Language Management feature. Please make sure it is safe to call the given <code>action</code> multiple times. This method could be expanded in the future to handle other scenarios where the page is re-rendered. Actions can be registered at any time, even before the DOM is ready, but will be called the earliest when the DOM is ready. |

- The EM Frameworks brings some tools to avoid using hard-coded strings used for display

The EM Framework (version 3 and above) provides the `$module->tt()` function (*tt* is an acronym for *translatable text*) which returns the string corresponding to a given key, and optionally performs string interpolation, replacing any placeholders with the values provided. For ease of use, `tt()` is available directly from the module instance: `$module->tt()`, or `$this->tt()` (from within the module).

The function signature of `tt()` is as follows:

```
function tt($key, ...$values) { }
```

| Argument | Description |
|-----------------------|---|
| <code>\$key</code> | A valid key in the language file of the module. If no entry with the key can be found, the message <i>"Language key 'key' is not defined for module 'unique module name'"</i> will be returned instead. If <code>null</code> or an empty value is passed, an exception will be thrown. |
| <code>\$values</code> | Optional values passed as separate arguments to be used for interpolation (i.e. to replace placeholders in the language string, in the order passed). If the first argument after <code>\$key</code> is an array, its members will be used and any further arguments will be ignored. Values are submitted to <code>htmlspecialchars()</code> before interpolation. |

Questions?

Discussion!