

# REDCap - Overview

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## Background

"REDCap (Research Electronic Data Capture) is a secure, web-based application designed exclusively to support data capture for research studies. REDCap provides: 1) an intuitive interface for data entry (with data validation); 2) audit trails for tracking data manipulation and export procedures; 3) automated export procedures for seamless data downloads to common statistical packages (SPSS, SAS, Stata, R); 4) procedures for importing data from external sources; and 5) advanced features, such as branching logic and calculated fields." (REDCap Website 2010)

## Features

### Data Entry Forms

### Design

Current form: **Patient Identification**

[Edit form name](#)

[Preview this form](#)

The screenshot shows the REDCap form design interface for a form titled "Patient Identification". The interface is organized into a vertical stack of field containers, each with an "Add Field Here" button above it. The first container is a yellow header bar with a pencil and red 'X' icon, labeled "Patient ID". The second container is for the variable "study\_id", labeled "Study ID", with a text input field. The third container is for the variable "emergency\_contact", labeled "Patient Contact", with a text input field and the instruction "include name & phone number". The fourth container is for the variable "date\_enrolled", labeled "Date subject signed consent", with a date input field showing "31" and the format "YYYY-MM-DD".

Figure 1 (REDCap Survey Demonstration 2010)

**Edit Field** ✕

You may add a new database field to this data entry form by completing the fields below and clicking the Save button at the bottom. When you add a new field, it will automatically be appended to the form on this page. For an overview of the different field types available, you may view the [Field Types video \(5 min\)](#).

**Select a Type of Field**

Text Box ▾

**Field Label**

Patient Contact

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

ONLY letters, numbers, and underscores

**Validation?** (optional) ---- None ---- ▾

**Required?\***  No  Yes

\* Prompt if field is blank

**Identifier?**  No  Yes

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

**Field Note** (optional)

**Branching/Skip Logic** (optional) [How do I use this?](#)

Figure 2 (REDCap Survey Demonstration 2010)

Data entry forms are created using a visual click and drag design tool. Figure 1 shows development of a form. Fields can be edited to define the data type to store and other properties. Figure 2 shows editing a field with two useful options: one for validation and the other marking the field as containing identifiable data. Designing the form also creates the database backend to store the entered values.

## Data Entry Form Features

Following is a short list of some of the features available:

1. Data entry forms can be saved as a PDF file and printed for completion by hand
2. Forms can be marked as incomplete, awaiting verification and completed
3. Records can be locked to restrict further modification of data
4. Questions can branch to further questions (e.g., answering female to gender could reveal a question about pregnancy)
5. Files can be attached to each record that is entered

## Databases

REDCap permits management of multiple databases and each database is assigned to one study for data collection.

### Database Status

The database can be set to one of three status levels:

1. Development status
2. Production status
3. Inactive status

### Development Status

This is the status during the design phase. Test data can be entered using the forms or using data import. The test data will automatically be removed when the status changes to production.

### **Production Status**

Production status indicates that the database is ready for collected data to be entered and stored in the database.

### **Inactive Status**

Once data collection is complete the status is changed to inactive. The data can still be accessed and, but most database functionality is disabled. If further data collection is required the status can be changed back to production.

### **Archiving**

The database can be archived when no longer needed. Although archiving removes it from the list of active databases it can still be accessed and, if further data collection is required, re-activated.

### **Security**

### Basic User Rights

- Calendar
- Data Export Tool
  - No Access
  - De-Identified
  - Full Data Set
- Data Import Tool
- Data Comparison Tool
- Logging
- File Repository
- User Rights
- Data Access Groups
- Reports & Report Builder
- Database Setup/Design

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Settings pertaining to record locking and E-signatures:

- Record Locking Customization
- Lock/Unlock Records
  - Disabled
  - Locking / Unlocking
  - Locking / Unlocking with E-signature authorityUsers with locking privileges also have access to the E-signature and Locking Mgmt page on the left-hand Applications menu. [What is an E-signature?](#)
- Allow locking of all forms at once for a given record?

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Settings pertaining to database records: [Explain these settings](#)

- Create Records
- Rename Records
- Delete Records

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Expiration Date (if applicable)

### Data Entry Rights

	None	Read	Edit
Patient Identification	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Visit	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Demographics	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Pregnancy	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Anthropometrics	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Randomization	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Vitals	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Medical History	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Immunizations	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Physical Exam	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Family History	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Comorbidities	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Ecg	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Study Medication Dispensing Return	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Drug Screen	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Pk Pd Specimen Collection	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Laboratory Results	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Study Medication Administration	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Subject Disposition	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Concomitant Medications	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Adverse Events	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Serious Adverse Event	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Protocol Deviations	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>

Figure 3 (REDCap Survey Demonstration 2010)

REDCap requires each user to login before accessing any data and once a user is logged in they are subject to assigned rights as shown in Figure 3. The data is stored on a MySQL database that also has its own security policy. REDCap also supports LDAP which fits in well with epiLab.

### Audit Trail and Logging

All actions on related to a database are logged from actions such as renaming a field or downloading a PDF to modifying the database itself or altering user rights. Events to be viewed can be filtered by type, user, record and chronological order. The complete log file can be downloaded as a CSV.

### File Repository

REDCap provides a file repository for each database. The files can be uploaded by users with appropriate rights and downloaded by other users of the database. Any previous data exports are also stored here and can be downloaded again in a choice of formats: SPSS, Excel SAS, R and STATA.

## Data Export and Import

### Data Export

The data export tool allows the user to download data for specified forms and, for finer control, specific fields. The download formats available are: SPSS, Excel SAS, R and STATA.

#### De-Identification Options

**De-Identification Options** (optional)

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

**Known Identifiers:**

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

**Free-form text:**

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

**Date fields:**

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

[Deselect all options](#)

Figure 4 (REDCap Survey Demonstration 2010)

Figure 4 shows de-identification options available during data export.

### Calendar

The Calendar application can be used as a project calendar within the databases to help organize schedules and keep track of any upcoming events. It can be viewed in a daily, weekly, or monthly format.

### Graphical View and Stats

This tool allows users to view real-time plots and statistics about the data collected in their database, which includes scatter plots, bar charts, and descriptive stats. Other functionality exists, such as finding missing values and highest/lowest values for a database field, which can aid in cleaning data.

## References

REDCap Website 2010. *Software*. Available at: <http://www.project-redcap.org/software.php> (Accessed 16th August 2010).

REDCap Survey Demonstration 2010. Available at: <https://octri.ohsu.edu/redcap/> (Accessed 5th August 2010).