



Clinical Data Pull Overview

REDCap's "Clinical Data Pull" feature provides the ability to launch a REDCap window while inside an EHR and to quickly and seamlessly import clinical data from the EHR into a REDCap project. As a built-in module in REDCap that can be enabled by an administrator, this feature can interface with any EHR system that has FHIR web services enabled.

Keywords

- EHR = Electronic Health Record system (e.g., Epic, Cerner; interchangeable with "EMR")
- CDP = Clinical Data Pull (module in REDCap for importing clinical data)
- [FHIR](#) = Fast Healthcare Interoperability Resources (standardized data format; pronounced "fire")

Purpose

A major impetus for using the Clinical Data Pull feature in REDCap is for re-using clinical data from the EHR, especially for research purposes. If you are performing a research study and collecting data in REDCap, it is typically preferred to have all your data stored and accessible from one single place, and thus it is often more efficient, for both data entry workflow and data analysis purposes, to have all study-centric data stored in REDCap.

The module transfers structured clinical data in real time from the EHR to REDCap. This allows users to avoid repeated data entry, which often compromises data quality by creating errors in clinical data values. This kind of system-to-system data transfer proves to be most efficient and provides the greatest amount of data quality.

How It Works

The Clinical Data Pull feature in REDCap utilizes the "SMART on FHIR" technology stack (sometimes referred to simply as "FHIR services"), which is a set of HTTP web services that can transfer data out of an EHR in a standardized FHIR data format. The FHIR web services utilize OAuth2 for authorization of users in the EHR when exporting data from the EHR into REDCap. Most popular EHR systems have their own implementation of the FHIR web services, thus the setup process on the EHR side may vary from system to system, but the overall technology framework and data format will work essentially the same for all FHIR-enabled EHRs.

From a technical standpoint, the Clinical Data Pull module requires that the EHR's server that hosts the FHIR services will communicate securely via HTTPS with that institution's REDCap server (and vice versa). Therefore, all communication for this module will stay in the bounds of the institution's network. In order for the two systems to communicate with each other and operate successfully, some setup will be required both on the REDCap side and on the EHR side. Thus, it is required that you find a contact person on your EHR's technical team to work with them during the setup process and follow the setup instructions carefully.

System-level Installation and Setup

In brief, a contact person on the EHR technical team needs to create a client/app on the EHR system, in which the app has credentials (e.g., client ID, client secret) in order for REDCap to utilize the FHIR web services for the EHR. Part of this requires you to obtain necessary configuration information to enter on the “Clinical Data Interoperability Services” page in REDCap Control Center, and set it as Enabled on that page. Then the EHR contact person must create a launch point (e.g., button, link, or menu item) inside the EHR user interface to launch your FHIR app/client (i.e., to open REDCap as embedded inside the EHR). Once REDCap can be launched from inside the EHR, REDCap will additionally be able to make remote calls to the EHR when users utilize CDP while outside of the EHR interface in REDCap (i.e., in their web browser using REDCap normally).

While the above description is a summarized view of the setup process, **for full detailed instructions regarding the installation of this module, please see the “Setup Instructions” document** from the zip file downloaded on the “Clinical Data Interoperability Services” page in the REDCap Control Center.

Project-level Setup and Field Mapping

In order to use the Clinical Data Pull functionality, a REDCap project must first have the Clinical Data Pull module enabled on the Project Setup page. Only a REDCap administrator may enable the module. Once enabled, any project user with CDP Mapping privileges will be able to navigate to the CDP Mapping page in the project to begin to map EHR data fields to fields in the REDCap project. (Note: It is assumed at this point that the use has already created their data entry forms and fields in the project.) Once the mapping process has been completed, users can then begin to utilize CDP to import data from the EHR into their project.

MAP SOURCE FIELDS TO REDCAP FIELDS		
External Source Field (StarPanel)	Map to REDCap Field	Map to REDCap date/time field (Date/time value is used with day offset to construct window of time when searching for source data)
mrn "Medical Record Number" ★ Source Identifier Field	mrn "Medical record number"	
Demographics		
dob "Date of Birth"	dob "Date of birth"	
ethnicity "Ethnicity"	ethnicity "Ethnicity"	
firstName "First Name"	first_name "First Name"	
gender "Gender"	sex "Gender"	
lastName "Last Name"	last_name "Last Name"	
race "Race"	race "Race"	
Labs		
AN-GAP "ANION GAP" ♦ Use same mapping for other source field	angap "Anion gap (AN-GAP)" ♦ Map other REDCap field	Date/time field: visit_date "Visit date" Preselect a value (optional): -- none --
BUN "UREA NITROGEN BLOOD" ♦ Use same mapping for other source field	bun "Urea nitrogen blood (BUN)" ♦ Map other REDCap field	Date/time field: visit_date "Visit date" Preselect a value (optional): -- none --
CO2 "CARBON DIOXIDE BLOOD"	co2 "Carbon dioxide blood (CO2)"	Date/time field: visit_date "Visit date"

Number of fields selected: 31

Source Fields List Filter:

☒ id (Medical record number) ?

☐ Demographics select all | deselect all

☒ birthDate (Date of birth) ?☒ gender (Sex) ?☒ name-family (Last name) ?☒ name-given (First name) ?☒ address-line (Address (street)) ?☒ address-city (Address (city)) ?☒ address-state (Address (state)) ?☒ address-postalCode (Address (postal code))☒ address-country (Address (country)) ?☒ phone-home (Phone number (home)) ?☒ phone-mobile (Phone number (mobile)) ?☒ email (Email address) ?

☐ Condition select all | deselect all

☒ problem-list (Problem List and health coner)

☐ Medications select all | deselect all

☒ active-medications-list (Active medications)

☐ Vital Signs select all | deselect all

☒ 8480-6 (Systolic blood pressure) ?☒ 8462-4 (Diastolic blood pressure) ?☒ 8310-5 (Body temperature) ?☒ 8867-4 (Heart rate) ?☐ 9270-1 (Respiratory rate) ?

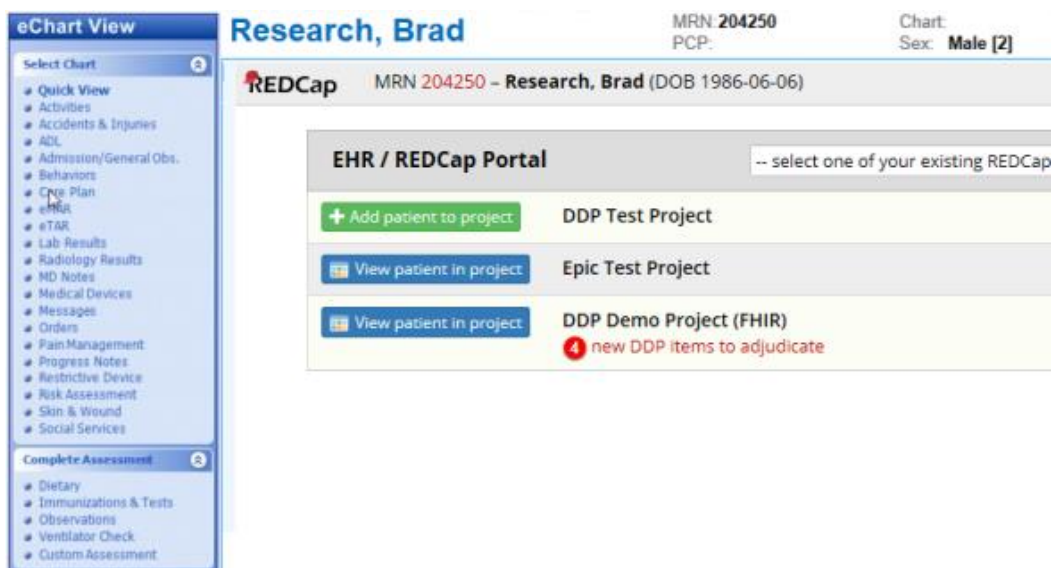
Importing Clinical Data into REDCap using CDP

The “Clinical Data Pull” functionality may be utilized in both of the ways described below.

1. EHR Launch

- a. “EHR Launch” refers to launching a REDCap window from inside the EHR interface. This window provides a patient-level context so that the patient currently being viewed in the EHR may have their clinical data imported into a REDCap project.
- b. Displayed in the window will be a list of REDCap projects that are CDP enabled, in which the user may choose to view the patient’s record inside a given project or (if not yet added) may add the patient to a project. This is easily done just by clicking the “Add patient” button next to the project name.
- c. If non-temporal CDP fields (e.g., demographics) have been mapped in the project, then data for those fields will be immediately fetched from the EHR and added to the project when the “Add patient” button is clicked.
- d. If the user navigates inside a project, the patient record may be viewed via the Record Home Page and via data entry forms in the project in typical REDCap fashion. Data may be entered in this view, and CDP data may be adjudicated and imported into the project, if desired. Thus, once inside a project, the user may perform typical data entry operations as they normally would in REDCap.
- e. **Note: The EHR Launch must always be the first step before using “Clinical Data Pull”** because the launch itself initiates a user’s authorization for the FHIR services on the REDCap side. Once a user has been authorized by simply performing the EHR Launch once, they can use CDP either from inside the EHR launch window or from the REDCap side (outside the EHR).

EHR Launch (REDCap embedded in a window in the EHR)



eChart View

Research, Brad MRN: 204250 PCP: Chart: Sex: Male [2]

REDcap MRN 204250 – Research, Brad (DOB 1986-06-06)

My Projects Project: **Epic Test Project**

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

Study ID 3

Data Collection Instrument	Status
Demographics	Incomplete
Baseline Data	Unverified
Month 1 Data	Unverified
Month 2 Data	Unverified
Month 3 Data	Unverified
Completion Data	Unverified

Legend for status

- Incomplete
- Unverified
- Complete

2. Clinical Data Pull

- “Clinical Data Pull” refers to the process of importing and adjudicating EHR data into a REDCap project. As noted above, once a user has been authorized via the EHR Launch, they can use “Clinical Data Pull” either from inside the EHR launch window or from the REDCap side (outside the EHR). Either way is legitimate and is to the user’s discretion as to which way they might prefer to access the patient’s record in REDCap. To see a demonstration of CDP in action, you may view a 5-minute [video of the CDP module](#).
- Adjudication** – “Adjudication” refers to the process in which **EHR data is manually reviewed and approved by a user before it is officially saved and stored in the REDCap project**. The adjudication process is done for data quality purposes to ensure that the correct data values get imported. In many cases, extraneous data points may be pulled into REDCap from the EHR, but only some of them may be the desired data to be imported. Thus, a user is needed to adjudicate this data inside an adjudication popup window in the project to confirm that the correct data gets stored. The adjudication process can be done either within the EHR launch window and/or on the REDCap side in a browser.
- If accessing REDCap from within the EHR launch window, then the patient is already known, so you will be taken to the patient’s Record Home Page if you navigate into a project. On the Record Home Page, you may adjudicate any data that has been imported from the EHR, or you may enter more data inside a data entry form.
- If accessing a patient record on the REDCap side (outside the EHR), then you will have to choose the record from the record list in the REDCap project. If the patient does not exist in the project yet, you may add a new patient by first creating a record and then entering the patient’s MRN (medical record number) into the REDCap field that has been mapped as the MRN field, after which REDCap will immediately begin pulling the patient’s data from the EHR in real time.
- If temporal data fields have been mapped (i.e., fields with an associated date/time of service), such as labs or vitals, then those values will only be retrieved from the EHR after their associated temporal field has been entered (often a “visit date” field or similar).

Adjudication of EHR data

Adjudicate data from EHR

[View DDP adjudication instructions](#)


Fetching data for **Study ID "3"** using **±365 days** Refresh data from EHR using ± 365 days from date AND time
min: 0.01 days (15 minutes), max: 365 days

New items: **13** Time of last data fetch: 2 days ago View 1 hidden items (existing values)


REDCap Field	REDCap Date/Time	EHR Source Date/Time	REDCap Current Value	EHR Source Value	Import?
Demography					
first_name "First Name"	-	-		Micci	<input checked="" type="radio"/> reset
last_name "Last Name"	-	-		Research	<input checked="" type="radio"/> reset
sex "Gender"	-	-		Female (F)	<input checked="" type="radio"/> reset
dob "Date of birth"	-	-		1980-12-15	<input checked="" type="radio"/> reset
address_street "Address (street)"	-	-		1234 Wiggy Way	<input checked="" type="radio"/> reset
address_city "Address (city)"	-	-		Nashville	<input checked="" type="radio"/> reset
address_state "Address (state)"	-	-		TN	<input checked="" type="radio"/> reset
address_postal_code "Address (postal code)"	-	-		37212	<input checked="" type="radio"/> reset
address_country "Address (country)"	-	-		US	<input checked="" type="radio"/> reset
phone_number_mobile "Phone number (mobile)"	-	-		615.362.2222	<input checked="" type="radio"/> reset


Save Cancel


Labs (Basic Metabolic Panel)


 Editing existing Study ID **50** 9 new items from source system View


Study ID 50


Visit date H 2008-08-14 31 Today Y-M-D 
* must provide value

Sodium blood (Na) H 

Potassium blood (K) H 

Chloride blood (Cl) H 


Carbon dioxide blood (CO2) H 

Urea nitrogen blood (BUN) H 

Adjudicate data from StarPanel

Displayed below is the data fetched from the external source system. It will display all the mapped REDCap fields that have source data returned. To import the source data values into REDCap, select the source value by clicking the radio button for the desired value in the row. Some fields may have multiple values returned, so you must choose the best or most correct value. Once you made all your selections, press the Save button below to save the source values into REDCap.

Fetching data for Study ID "50" using ± 30 days

 Refresh data from StarPanel

using ± 30 days from date AND time

min: 0.01 days (15 minutes), max: 365 days

New items: 9

Time of last data fetch: just now

- ☒ Display all items (all forms)
☐ Display only this form's items

[View 6 hidden items \(existing values\)](#)

REDCap Field	REDCap Date/Time	StarPanel Source Date/Time	REDCap Current Value	StarPanel Source Value	Import?
na "Sodium blood (Na)"	2008-08-14 (00:00)	2008-08-14 11:06		140	<input type="radio"/> reset
		2008-08-14 11:16		135	<input checked="" type="radio"/> reset
		2008-08-14 13:39		140	<input type="radio"/> reset
k "Potassium blood (K)"	2008-08-14 (00:00)	2008-08-14 11:06		4.0	<input type="radio"/> reset
		2008-08-14 11:16		3.5	<input checked="" type="radio"/> reset
		2008-08-14 13:39		4.0	<input type="radio"/> reset
cl "Chloride blood (Cl)"	2008-08-14 (00:00)	2008-08-14 11:06		104	<input type="radio"/> reset
		2008-08-14 11:16		105	<input checked="" type="radio"/> reset
		2008-08-14 13:39		104	<input type="radio"/> reset
co2 "Carbon dioxide blood (CO2)"	2008-08-14 (00:00)	2008-08-14 11:06		24	<input checked="" type="radio"/> reset
		2008-08-14 11:16		25	<input type="radio"/> reset
		2008-08-14 13:39		24	<input type="radio"/> reset

Save

Cancel