

**REDCap's Clinical Data  
Interoperability Services  
(CDIS) Operating Manual**



## *Table of Contents*

<b>What is CDIS</b> .....	<b><a href="#">2</a></b>
Clinical Data Pull (CDP).....	<a href="#">2</a>
Clinical Data Mart (CDM) .....	<a href="#">2</a>
<b>CDIS Documentation and FAQ</b> .....	<b><a href="#">3</a></b>
Set Up instructions and Technical Specifications .....	<a href="#">5</a>
String Identifier Verification/Location .....	<a href="#">5</a>
Overview Document .....	<a href="#">6</a>
General Information Page.....	<a href="#">6</a>
Key Differences between CDP and CDM page .....	<a href="#">6</a>
<b>VUMC/VU Activation Process</b> .....	<b><a href="#">8</a></b>
Proper Documentation/Approvals .....	<a href="#">8</a>
Activation Survey and User Support.....	<a href="#">10</a>
Administrative Checks and Balances .....	<a href="#">12</a>
<b>CDIS Specific Features</b> .....	<b><a href="#">12</a></b>
Mapping and Mapping Helper .....	<a href="#">12</a>
CDP Instant Adjudication .....	<a href="#">15</a>
Stand Alone Launch .....	<a href="#">17</a>
EHR Launch.....	<a href="#">17</a>
Access Token Generation.....	<a href="#">18</a>
Break the Glass .....	<a href="#">19</a>

## **What is CDIS?**

Clinical Data Interoperability Services (CDIS) is an advanced feature of REDCap that must be enabled by a REDCap administrator. This feature allows an individual REDCap project to interact with an electronic health record (EHR) such as EPIC, Cerner, etc. and pull selected information from the EHR into the REDCap project. This is done through the Fast Healthcare Interoperability Resources (FHIR) web service inside of EPIC which pulls structured data into REDCap using OAuth2 authorization. For a complete list of available data that can be pulled into REDCap please see [CDIS documentation](#).

Currently at Vanderbilt University Medical Center CDIS can only be used for research and operational support projects (*Please note that this policy is specific to Vanderbilt. If a REDCap user is outside of the Vanderbilt system, please refer to your institution's policies*). Please see the [Proper Documentation/Approvals](#) for more information regarding steps to take before requesting access. There are two options for pulling information from the EHR into a REDCap project Clinical Data Pull (CDP) and Clinical Data Mart (CDM).

### **What is Clinical Data Pull (CDP)**

Formerly called Dynamic Data Pull (DDP), CDP is a special feature for importing information from the EHR into an existing REDCap project either manually in real time or automatically in bulk when triggered by a REDCap user. From the EHR interface, Clinical Data Pull can create new records in a CDP-enabled REDCap project. Additionally, if a user knows the patient identifier (i.e., medical record number), then they could optionally enter the MRN for a record in a CDP-enabled REDCap project, after which it will then go and immediately retrieve the patient data from the EHR in real time. This option is best for researchers who are conducting prospective studies and need to frequently update multiple records and fields in REDCap with information from the EHR. It also is best when there is a finite number of values needing to be saved. Ex: highest glucose, lowest creatinine, etc.

This feature can only be enabled by a REDCap Administrator please refer to the [VUMC/VU Activation Process](#) section for more information regarding how to request the CDIS feature. You can request this feature before or after you create your REDCap project but can only be activated once the project has been created.

### **What is Clinical Data Mart (CDM)**

CDM is a special feature in which data can be fetched in bulk from an EHR system into a REDCap project. CDM must be initiated on the project creation page and the ability to create a CDM project is managed through the REDCap user profile. To retrieve the desired data a fetch request must be created and within the request the date range in which to look, specific data elements, and a list of MRNs must be specified. These three requirements can be provided at the time of project creation or after the project is created from within the Clinical Data Mart page. This option historically was best for researchers who were conducting retrospective studies or for researchers who are conducting studies in which a larger number of values are needed for a given subject. Ex: Save all glucose values over the last 7 days.

This feature can only be enabled by a REDCap Administrator please refer to the [VUMC/VU Activation Process](#) section for more information regarding how to request the CDIS feature. ***You must request this feature BEFORE you create your REDCap project.***

## **CDIS Documentation and FAQ**

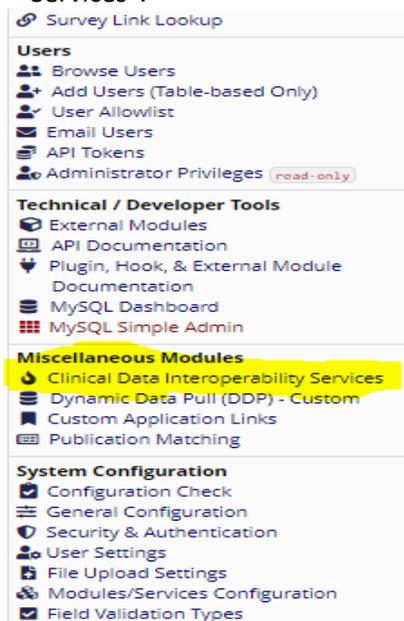
Please see the [What is CDIS? section](#) for a general overview of CDIS. You do not have to use this feature to get information manually from the EHR, however if you need an automatic way to pull information then you will have to use CDIS.

More information can be found in the “Clinical Data Interoperability Services” section in the REDCap control center. Please see instructions for how to access the location of CDIS materials referenced in this section.

1. Login to REDCap and click on “Control Center” at the top of the REDCap home page.



2. Go to “Miscellaneous Modules” on the left-hand side and click on “Clinical Data Interoperability Services”.



3. From there you can access additional information regarding setting up and implementing the clinical data interoperability services.

**Clinical Data Interoperability Services**



REDCap can communicate with any EHR (electronic health record system) that has implemented 'SMART on FHIR' web services that allow for interoperability and data extraction from the EHR. In this way, REDCap can be embedded inside and launched within an EHR user interface (e.g., Cerner, Epic Hyperspace), which allows REDCap users to easily add patients to their projects and/or to access patient data inside a REDCap project. In addition to launching REDCap inside the EHR, REDCap can also extract data from the EHR to import clinical data into a REDCap project by using a feature called 'Clinical Data Pull' (CDP). CDP provides an adjudication process whereby REDCap users can approve all incoming data from the EHR before the data is officially saved in their REDCap project. Another feature is called 'Clinical Data Mart' and works differently than CDP in that Data Mart can pull patient information in bulk while CDP pulls patient information from the EHR just one patient at a time. To learn their differences and strengths, see the sections below for documentation.

Before 'Clinical Data Interoperability Services' can be used by REDCap users, it must first be set up and enabled on this page. To get started, download the ZIP file linked below, and follow the instructions contained therein. There may be instructions for your particular EHR, but if not, then you may use the 'Instructions - General' file. After you have followed the setup procedures, the REDCap user may begin using the Clinical Data Mart and Clinical Data Pull in REDCap. While the Data Mart can only be used on the REDCap side, CDP can optionally be used either inside the EHR user interface or from the REDCap side (without being inside the EHR).

- [Overview of Clinical Data Pull and Clinical Data Mart](#)
- [Informational page on how to use Clinical Data Pull \(for providing to users\)](#)
- [Setup instructions and technical specifications \(ZIP\)](#)

**Below are some frequently asked questions about CDIS:**

1. Can I get data from the EHR in real time?
  - a. Yes, when you enable CDIS the transfer of clinical data from the EHR into the REDCap project is in real time.
2. What can be imported from the EHR into a REDCap field?
  - a. Demographics (ex: address, date of birth, first and last name, home and mobile phone numbers, deceased status and time, preferred-language, gender, race, and ethnicity)
  - b. Current problems list
  - c. Medications list (active, completed, on-hold, stopped)
  - d. Allergy intolerance list
  - e. Vital signs
  - f. Laboratory
3. What do I need to do to request CDIS?
  - a. Please refer to the [Proper Documentation/Approvals section](#). Please note that this is specific to Vanderbilt, if you are outside of the Vanderbilt system then please refer to your institution's process.
4. If I am a Vanderbilt REDCap user who would like to learn more about CDIS where would I go?
  - a. There are virtual monthly seminars that will introduce the use of CDIS features including CDP and CDM. Specific topics include:
    - i. CDIS activation process (specific to Vanderbilt REDCap users)
    - ii. REDCap project set up and configuration for CDIS use
    - iii. Adding patient to CDIS projects
    - iv. Live Demo of both CDP and CDM
  - b. To sign up you will be asked for your VUNet ID and password so please only click on the register information if you are a Vanderbilt REDCap user. If you would like to sign up for a monthly seminar please click [here](#) or search [StarBRITE](#) for upcoming sessions. If you are unable to come to a virtual session then you can see a previously recorded session [here](#).
5. If I am not a Vanderbilt REDCap user and I would like some additional guidance on setting up CDIS at my institution where would I go?
  - a. We do offer bimonthly virtual seminars (CDIS office hours) that are geared towards people, not at Vanderbilt, who are trying to set up the CDIS module. You will need to make sure that your institution has a valid REDCap license, and you may need to involve your EHR team in this process.
    - i. We are now using a pre-registration process to help us prepare and guide conversations accordingly please use this [link](#). These sessions are held twice a month on Friday at 12 pm (CST).

## Set Up Instructions and Technical Specifications

This can be found in the “Setup instructions and technical specifications (Zip)” document in the REDCap control center. Please refer to this for in depth instructions.

The main takeaway is that a contact person on the EHR technical team needs to create a FHIR client/app on the EHR system, in which the app has credentials (e.g., client ID, client secret) for REDCap to utilize the FHIR web services for the EHR. If you are using EPIC then creating a FHIR app is not required since REDCap utilizes the EPIC “App Orchard”. Part of this requires you to obtain necessary configuration information to enter on the “Clinical Data Interoperability Services” page in the REDCap Control Center and set either of the modules as “Enabled” on that page. The next step is that 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 directly from within REDCap.

## String Identifier Verification/Location

The string identifier is a series of numbers, letters, or characters that will allow a patient’s stored identifier to convert to an actual medical record number. Most Electronic Health Record Systems do not use a medical record number as the back-end naming convention for patients; because of this you must provide a system identifier that REDCap will use to retrieve each patient’s MRN from a FHIR data bundle.

**Note for Epic customers: This is the HL7 Root item in the Epic ID Type Record (IIT) specified in the Patients ID Type field of the Integration Configuration Record (FDI)**

The String Identifier is to be entered into the “EHR’s patient identifier string for medical record number(optional)” on the Clinical Data Interoperability Services page of the control center. Example below.

### EHR’s patient identifier string for medical record numbers (optional)

Most EHRs will not use medical record number as the back-end naming convention of patients, so in that case, you must provide a system identifier that REDCap will use to retrieve each patient’s MRN from a FHIR data bundle.

e.g., urn:oid:1.2.840.114350.1.13.478.3.7.5.737384.14

e.g., urn:oid:1.1.1.1.1.1

**Note for Epic customers: This is the HL7 Root ID in the Epic ID Type Record (IIT) specified in the Patient ID Type field of the Integration Configuration Record (FDI).**

There are a few tips that could prove helpful in finding your sites unique string identifier. First try to use the same text in the example (“urn:oid:1.2.840.114350.1.13.478.2.7.5.737384.14”), some Epic installations will use this same ID. Second try to select the “Find patient identifier string” in which REDCap provides. If neither of these work contact your EHR support staff to help locate this ID.

## Overview Document

This can be found in the “Overview of Clinical Data Pull and Clinical Data Mart” document in the REDCap control center.

## General Information Page

General CDIS information can be found on the project setup page Under the Enable optional modules and customizations. Clicking on the  next to the “Clinical Data Pull from eStar” option will open a window of information which is controlled by the REDCap administrator.

## Key Differences Between CDP and CDM Page

This can also be found on the “Clinical Data Interoperability Services” page in the REDCap control center.

	<b>Clinical Data Pull</b>	<b>Clinical Data Mart</b>
<b>Most common uses</b>	<ul style="list-style-type: none"> <li>• Real-time data collection</li> <li>• Prospective clinical studies/trials</li> <li>• Longitudinal and/or multi-arm studies</li> </ul>	<ul style="list-style-type: none"> <li>• Registries</li> <li>• Prospective or retrospective clinical studies/trials</li> <li>• Searching for specific lab values or diagnosis codes for a cohort of patients over a set time period</li> </ul>
<b>Data mapping to EHR fields</b>	<ul style="list-style-type: none"> <li>• Field mapping must be set up prior to data pull by a user with CDP Setup/Mapping privileges in the project. This is completed via the CDP mapping page (accessed via the Project Setup page).</li> <li>• Mapping can be adjusted at any time in a CDP project, and it can be complex when mapping EHR fields to REDCap fields (allows for one-to-many, many-to-one, or many-to-many mapping).</li> <li>• Temporal data (e.g., vital signs and labs) must have an accompanying date or date/time field (e.g., visit date) for determining the window of time in which to pull data (using the <math>\pm</math> day offset). Temporal data can be mapped to fields in a classic project, to events in a longitudinal project, or to repeating instruments/events.</li> <li>• All values for Allergies, Medications, and Problem List will be merged together for each category and each saved in its own a Notes/Paragraph</li> </ul>	<ul style="list-style-type: none"> <li>• Mapping is not required since the project structure/instruments are pre-defined when the project is created. Demographics is created as a single data collection form, and the following forms are created as repeating instruments: Vital Signs, Labs, Allergies, Medication, and Problem List. Each data value on the repeating instruments are represented as a separate repeating instance of the form.</li> <li>• User defines the data pull configuration when creating the project- e.g., chooses specific MRNs, date range, and data fields from the EHR.</li> <li>• Project-level setting control whether or not users in the project can 1) fetch data just one time or as often as they which, and 2) modify the data pull configuration or not. These settings may be changed only by a REDCap administrator.</li> </ul>

	field (if mapped).	
<b>Activation process</b>	<ul style="list-style-type: none"> <li>The local institution may have a formal process to evaluate the users/project prior to approval (recommended)- e.g., check IRB status, check users' EHR access.</li> <li>REDCap administrator must enable CDP for the project on the project's Project Setup page.</li> </ul>	<ul style="list-style-type: none"> <li>The local institution may have a formal process to evaluate the users/project prior to approval (recommended)- e.g., check IRB status, check users' EHR access.</li> <li>Project is first created by a user, but each revision of the data pull configuration will go through an audit process and approved by a REDCap administrator via the To-Do List (if the project-level setting has been enabled to allow configuration changes).</li> </ul>
<b>User privileges</b>	<ul style="list-style-type: none"> <li>Project users can set up field mapping and adjudicate data from the EHR if they have project-level rights to do so. In order to adjudicate data from the EHR, users must have access to the EHR and must have launched at least one patient in the REDCap window inside the EHR user interface.</li> <li>REDCap administrator and team can optionally create a User Access Web Service to further control user access during adjudication (info documented on this page).</li> </ul>	<ul style="list-style-type: none"> <li>A user's REDCap account must be given Data Mart privileges by a REDCap administrator on the Browse Users page in the Control Center, after which the user will be able to create a Data Mart project and pull EHR data. (Note: This is not a project-level user right but a REDCap user account privilege.) Also, there is no optional User Access Web Service as there is with CDP to further control user access for pulling data.</li> <li>In order to pull data from the EHR, users must have access to the EHR and must have launched at least one patient in the REDCap window inside the EHR user interface.</li> <li>Users with Project Setup/Design rights in a Data Mart project will be able to request changes to the data pull configuration (if needed and if the project-level setting has been enabled).</li> </ul>
<b>Usage</b>	<ul style="list-style-type: none"> <li>Users must launch a patient in the REDCap window inside the EHR user interface and will be able to add the patient to any CDP-enabled REDCap project to which they have access. Once the patient is in a project, the user can manually pull data from the EHR for the patient.</li> <li>Data pulled from the EHR is not saved immediately in the project but is stored temporarily in a cache, in which users must first review/adjudicate all data values before being saved in the</li> </ul>	<ul style="list-style-type: none"> <li>Data Mart will only pull data from the EHR when a user with appropriate privileges clicks the "Fetch clinical data" button. There is no cron job to pull any new data at other times automatically.</li> <li>To pull new data values in the EHR, a user must manually click the Fetch button again (assuming the project-level setting is enabled to allow more than one data pull).</li> <li>Extra instrument or events may be added to the Data Mart Project, but if any of the pre-defined fields or</li> </ul>

	<p>project.</p> <ul style="list-style-type: none"> <li>Once a patient has been added to a project, CDP will automatically (via a cron job) continue to look for any new data added to the EHR for up to X days, in which X is the value of the setting "Time of inactivity after which REDCap will stop checking for new data" (info documented on this page).</li> </ul>	<p>instruments are modified, it may prevent the data pull from working successfully thereafter.</p>
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### **VUMC/VU Activation Process**

Please note that this process is specific to Vanderbilt. If a REDCap user is outside of the Vanderbilt system, then please refer to your institution's policies.

At Vanderbilt we allow all users of REDCap to be able to create a REDCap project and to configure CDIS after admin approval. However, this is not always the case at other institutions for a variety of reasons. If you are not sure if you can create a REDCap project or turn on the CDIS module then you will need to reach out to your local REDCap team. If the local REDCap team has any questions or concerns, please refer them to our biweekly virtual seminar and we would be happy to assist them in setting up CDIS.

### **Proper Documentation/Approvals**

There are a few things that you will need to do before you are ready to start the set-up process for CDIS if your project is for research purposes.

1. The study must have an active IRB protocol. You will need to ensure that the templated language for using CDIS is in the IRB submission. This language can be added into the initial IRB submission or later via an amendment. This approval is required before CDIS can be activated.
2. Anyone who will be using the CDIS module must be a Key Study Personnel (KSP) and be specifically named on the IRB protocol.
3. Your REDCap project settings' Purpose must be "Research" and all corresponding fields must be completed. Ensuring that active IRB number matches between the activation submission and project are required for data to be fetched.

**Modify Project Settings**

**Project title:**   
Title to be displayed on project webpage

**Purpose of this project:** Research  
How will it be used?

**Name of P.I. (if applicable):**    
First name MI Last name

**Email of P.I. (if applicable)**

**Name of P.I. as cited in publications (if applicable):**   
(e.g., Harris PA)

**VUNetID of P.I. (if applicable):**

**IRB number (if applicable):**

**Grant number (if applicable):**

**Please specify:**

- Basic or bench research
- Clinical research study or trial
- Translational research 1 (applying discoveries to the development of trials and studies in humans)
- Translational research 2 (enhancing adoption of research findings and best practices into the community)
- Behavioral or psychosocial research study
- Epidemiology
- Repository (developing a data or specimen repository for future use by investigators)
- Other

**Project notes (optional):**  
Comments describing the project's use or purpose that are displayed on the My Projects page.

- CDIS users must already have access to eStar and must have the security permissions to be able to access the information that is being pulled from the EHR into REDCap. For example, if a user cannot see a patient's medication list in the EHR then they will not be able to fetch it using CDIS.

If you are using CDIS for operational support, then you will still need to ensure that you have IRB approval for any future research that may come from this information. Please fill out the activation survey to the best of your ability and ensure that all users are complying with safety and privacy policies.

Please see below for IRB language to use in new IRB submissions or amendments.

**New REDCap projects:** *"This project will utilize the REDCap platform for data collection and management. Project team members listed as Key Study Personnel with existing electronic health record (EHR) system access rights may also be granted use of REDCap Clinical Data Interoperability Services (CDIS) tools. These tools are designed to enable transfer of relevant study-related data from the Vanderbilt Research Derivative and/or directly from the EHR into REDCap."*

**Existing REDCap projects (Amendments):** *"This amendment request adds the ability for project team members listed as Key Study Personnel with existing electronic health record (EHR) system access rights to make use of REDCap Clinical Data Interoperability Services (CDIS) tools. These tools are designed to enable transfer of relevant study-related data from the Vanderbilt Research Derivative and/or directly from the EHR into REDCap."*

Unless your project is operational support you will need to ensure that you have IRB approval before you submit the CDIS activation survey.

## Activation Survey and User Support

Before a REDCap administrator can grant access to the CDIS feature you must first fill out the [CDIS Activation Survey](#). For CDP this survey can be filled out before or after the REDCap project is created but for CDM this survey must be filled out before the REDCap project is created.

To fill out the survey you will need navigate to the [REDCap](#) log in page. From here there are two ways to get to the Activation Survey.

1. The first way is directly from the log in page. Scroll down to the “Want to learn more about REDCap?” section and click on the “User FAQ page” link. This will take you to the FAQ page where you can learn more about what CDIS, how to request activation, and other useful elements. The activation survey must be complete BEFORE you create your REDCap project.

### Want to learn more about REDCap?

The [REDCap Overview video](#) is a detailed demonstration of the basic features and functionality.

#### Want to learn more about Clinical Data Interoperability Services (CDIS)?

CDIS automates pulling of eStar data into your REDCap project. To learn more, visit our [User FAQ page](#). CDIS Seminars are offered the first Thursday of every month. These in-person sessions provide a fundamental overview of CDIS and ways to incorporate it into your work. Please [register here](#), or [search StarBRITE](#) for upcoming sessions.

#### Need help with REDCap?

If you have any questions about REDCap, **please contact us at:** [redcap@vumc.org](mailto:redcap@vumc.org). Most questions or problems can be resolved by email within 1-2 business days.

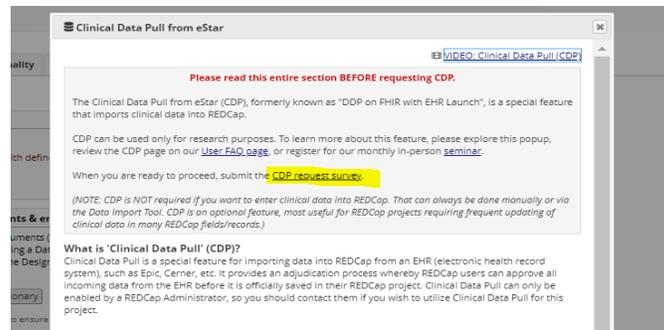
Supplementary self-help resources and other information are available on our local [User FAQ page](#) and our [StarBRITE page](#), including [template language](#) to use in grants or IRB documentation.

2. The second way is directly from within any REDCap project. The question mark next to the “Clinical Data Pull from eStar” under the “Enable optional modules and customization” can provide not only the activation survey link but a wealth of other CDIS related materials.

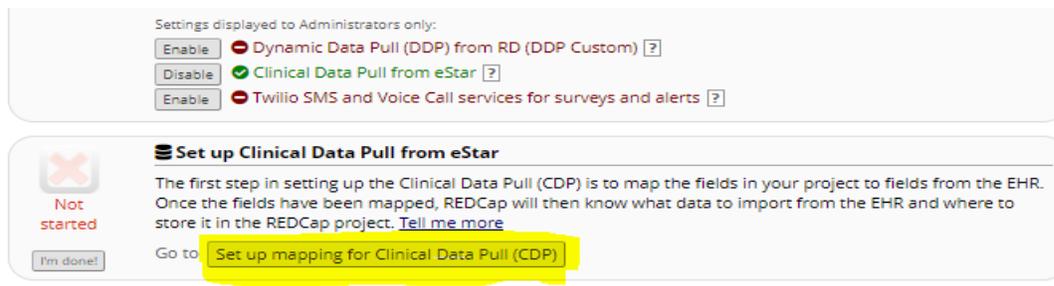
The screenshot shows the REDCap Project Setup interface. At the top, there are navigation tabs: Project Home, Project Setup, Other Functionality, Project Revision History, and Edit project settings. Below these, the project status is shown as 'Development' with 'Completed steps 0 of 7'.

The main content area is divided into three sections:

- Main project settings:** Includes options to 'Use surveys in this project?' (checked) and 'Use longitudinal data collection with defined events?' (checked). A link to a video 'How to create and manage a survey' is provided.
- Design your data collection instruments & enable your surveys:** Provides instructions on using the Online Designer or Data Dictionary, and links to the REDCap Shared Library.
- Enable optional modules and customizations:** This section is highlighted. It includes several toggle switches:
  - Repeatability instruments (checked)
  - Auto-numbering for records (checked)
  - Scheduling module (longitudinal only) (checked)
  - Randomization module (checked)
  - Designate an email field for sending survey invitations (checked)
 Below these are 'Additional customizations' and 'Settings displayed to Administrators only', which includes:
  - Dynamic Data Pull (DDP) from RD (DDP Custom) (checked)
  - Clinical Data Pull from eStar (checked)** - This link is highlighted in yellow in the original image.
  - Twilio SMS and Voice Call services for surveys and alerts (checked)



Once the CDIS feature is enabled the “Clinical Data Pull from eStar” will be green. You are now ready to map your fields in REDCap to clinical information being pulled from the EHR by clicking on the “Set up mapping for Clinical Data Pull (CDP)”.



### User support:

User support is one of those unknown items. Even though user abilities can vary, CDIS has been designed to be very self-serve. On average each project could require 1-2 hours of administrative help. Setting up good resources for the user has proven instrumental.

Want to learn more about REDCap? The [REDCap Overview video](#) is a detailed demonstration of the basic features and functionality. **Want to learn more about Clinical Data Interoperability Services (CDIS)?** CDIS automates pulling of eStar data into your REDCap project. To learn more, visit our [User FAQ page](#). CDIS Seminars are offered the first Thursday of every month. These in-person sessions provide a fundamental overview of CDIS and ways to incorporate it into your work. Please [register here](#), or [search StarBRITE](#) for upcoming sessions. **Need help with REDCap?** If you have any questions about REDCap, **please contact us at: [redcap@vumc.org](mailto:redcap@vumc.org)**. Most questions or problems can be resolved by email within 1-2 business days. Supplementary self-help resources and other information are available on our local [User FAQ page](#) and our [StarBRITE page](#), including [template language](#) to use in grants or IRB documentation.

VUMC User Resources

Here at Vanderbilt University Medical Center, we created two specific help resources.

- 1) CDIS FAQ Page- The FAQ page is an amazing landing spot in which a user can learn more about what CDIS is, what it can do, and how to use it.
- 2) Monthly CDIS seminars- Every month we host two, 1 hour seminars in which users can get a firsthand look at what CDIS is, see a live demo, and ask project related questions.

**If you are not a Vanderbilt REDCap user and have additional questions about our processes, you can join our biweekly seminars to find out more information.**

**Administrative Checks and Balances**

REDCap has built in a few different locations in which an administrator must act for users to directly pull information out of the EHR. These features are necessary to ensure that REDCap users are adhering to institutional privacy and safety policies.

Administrator Approval

- Activation at the project level (CDP) or user level (CDM) are required for data to be pulled.
- Individual CDM fetch request approval from the TO DO list in the control center.
- Project creation (For sites that do not allow end users to create projects)

Data and Audit Trail

- CDIS does not allow any user to fetch data they do not already have access to in the EHR. Meaning if you cannot see patient medication then you cannot pull it into REDCap.
- REDCap has detailed logging to show who pulled what, where, and how

**CDIS Specific Features**

Once the CDIS Activation Survey has been filled out and a REDCap administrator has activated the functionality you are able to start the mapping process between the EHR and REDCap. Please note that some of this section is going to be specific to Vanderbilt if a REDCap user is outside of the Vanderbilt system then please refer to your institution's policies.

You can find detailed information about the CDIS special features in the REDCap control center. Specifically, the "Overview of Clinical Data Pull and Clinical Data Mart" and the "Setup instructions and technical specifications (ZIP)".

**Mapping and Mapping Helper**

Any project user who has access to CDIS will be able to access the CDP Mapping page. This is where you map fields in your REDCap project to the corresponding data being pulled from the HER. Go to the "project setup" page and click on "Set up mapping for Clinical Data Pull (CDP)".

Settings displayed to Administrators only:

- Enable  Dynamic Data Pull (DDP) from RD (DDP Custom) [?]
- Disable  Clinical Data Pull from eStar [?]
- Enable  Twilio SMS and Voice Call services for surveys and alerts [?]

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**Set up Clinical Data Pull from eStar**

The first step in setting up the Clinical Data Pull (CDP) is to map the fields in your project to fields from the EHR. Once the fields have been mapped, REDCap will then know what data to import from the EHR and where to store it in the REDCap project. [Tell me more](#)

Go to: [Set up mapping for Clinical Data Pull \(CDP\)](#)

This will pull up the main page where you can start the mapping process. The mapping helper can be instrumental in this process if looking for a very specific value or just unsure as to what can be pulled from the EHR. If you know exactly what you need then you can map the REDCap fields to the EHR data directly. Please see figure on next page for a more detailed explanation.

If you are unsure what can be pulled on any given patient, try the Mapping Helper. The Mapping Helper is designed to fetch a list of retrievable items for a specific patient.

[Mapping Helper](#)

Use this if you are unsure what can be pulled in from the EHR on a patient-by-patient basis.

**SETTINGS**

Preview Fields (optional):  
Source system fields can be selected that will provide a quick preview of data from the source system when a user initially enters the value of the source ID field.

Select preview fields from eStar (up to 5)  
[Add another preview field](#)

Default day offset (for temporal fields):  
When pulling temporal data (i.e. fields with an associated timestamp) from the source system, the day offset will be used in conjunction with the value of a mapped REDCap date/time field to create a window of time for searching for data in the source system. Only data within that window of time will be displayed during the adjudication process. This helps to provide a buffer of time in the instance that the date/time value from REDCap and/or the timestamp from the source system lack some amount of precision.

Default day offset:  
± 7 days  
min: 0.01 days (15 minutes), max: 365 days

Instant adjudication  
Temporal fields may have multiple values returned from the external source system; once you set a "preselect" value for ALL your mappings, you can enable 'instant adjudication' and REDCap will skip the 'adjudication' table preview and save the best or most correct value.

Instant adjudication  
Disabled  
0 temporal fields out of 0 are set

**MAP SOURCE FIELDS TO REDCAP FIELDS** [Import](#) [Export](#)

[Find more source fields to map](#)

When you specify the date/time field the default day offset will let the FHIR service know which labs around that timeframe to pull in for adjudication. This is an important step and is fully customizable.

This is a new feature that will allow a user to bypass having to adjudicate values as they are pulled in via FHIR from the EHR. We still recommend manual adjudication in the beginning to ensure that the correct data is being fetched.

Use this if you know what values you want to map. Please see below for more information regarding how to set up the mapping.

If you click on the “Find more source fields to map” another window will appear where you can specify the mapping. It is important to remember to do the following or your mappings **will not** save: You will need to specify the “id” in your mappings. This will be the MRN and it may be your record id or it may be a separate field in REDCap depending on how you have chosen to set up your REDCap project. This is important because the MRN is the primary key to link the patient in your project to the patient in the EHR.

The “FHIR field” is what will be pulled from the EHR (labs, vitals, demographics, etc.), “REDCap event” can be specified if there is more than one in your project, “REDCap field” is where the data will land once it is extracted from the EHR, “date/time” is the field in REDCap that will be the basis for your default day offset that you specified earlier and is only used for labs and vitals, and “Preselect value” is where you can specify highest/lowest/earliest/latest/nearest value from the EHR. Once the mapping is complete it will show up under “Map source fields to REDCap fields” from there you can edit/copy/delete the mapping. Remember to hit “save” to ensure that your mappings are not accidentally deleted.

**Clinical Data Pull from Epic**

The Clinical Data Pull (CDP) is a feature for importing data into REDCap from an EHR. It provides an adjudication process whereby REDCap users can approve all incoming data from the source system before it is officially saved in their REDCap project. The first step in setting up the Clinical Data Pull (CDP) is to map the fields in your project to fields from the EHR. Once the fields have been mapped, REDCap will then know what data to import from the EHR and where to store it in the REDCap project.

The mapping process consists of two steps: 1) choosing source fields from the external source system whose data you wish to import into your REDCap project, and 2) map these source fields to REDCap fields in your project. Once the source fields are mapped, REDCap will then be able to import source data as soon as a record is given a value for its Source Identifier Field (e.g., medical record number). Data from the source system will be fetched immediately in real time on a data entry form or on the Record Status Dashboard, and later it will also check the source system at regular intervals for any additional data. Tell me more

**SETTINGS**

Preview Fields (optional):  
Source system fields can be selected that will provide a quick preview of data from the source system when a user initially enters the value of the source ID field.

Default day offset (for temporal fields):  
When pulling temporal data (i.e., fields with an associated timestamp) from the source system, the day offset will be used in conjunction with the value of a mapped REDCap datetime field to create a window of time for searching for data in the source system. Only data within that window of time will be displayed during the adjudication process. This helps to provide a buffer of time in the instance that the datetime value from REDCap and/or the timestamp from the source system lack some amount of precision.

Instant adjudication  
Temporal fields may have multiple values returned from the external source system; once you set a "preselect" value for ALL your mappings, you can enable "instant adjudication" and REDCap will skip the adjudication table preview and save the best or most correct value.

Select preview fields from Epic (up to 5)  
[Add another preview field](#)

Default day offset:  
a 365 days  
min: 0.01 days (15 minutes), max: 365 days

Instant adjudication  
**Enabled**  
2 temporal fields out of 2 are set

**MAP SOURCE FIELDS TO REDCAP FIELDS** [Import](#) [Export](#)

External Source Field	Event	Field	Date/Time Field	Preselect Strategy	Actions
id <small>Source Identifier Field Medical record number</small>	Enrollment	mrn <small>MRN (Subject Enrollment)</small>			<a href="#">Edit</a> <a href="#">Delete</a>
problem-list <small>Problem list and health concerns (Consultation)</small>	Enrollment	problem-list <small>Problems List (Subject Enrollment)</small>			<a href="#">Edit</a> <a href="#">Delete</a>
birthdate <small>Date of birth (Demographics)</small>	Enrollment	dob <small>Date of birth (Subject Enrollment)</small>			<a href="#">Edit</a> <a href="#">Delete</a>
17851-4 <small>Calcium [Mass/volume] in Serum or Plasma (Laboratory)</small>	Pre surgery visit	pre_lab <small>Calcium (Pre-surgery visit)</small>	prelab_date <small>Date of labs: (Pre-surgery visit)</small>	Nearest value (based on timestamp)	<a href="#">Edit</a> <a href="#">Copy</a> <a href="#">Delete</a>
2441-0 <small>Body weight (Vital Signs)</small>	Enrollment	weight <small>Weight (kilograms) (Subject Enrollment)</small>	date_enroll <small>Date subject signed consent (Subject Enrollment)</small>	Nearest value (based on timestamp)	<a href="#">Edit</a> <a href="#">Copy</a> <a href="#">Delete</a>

[Find more source fields to map](#)

[Save](#) [Cancel](#)

**Create** X

FHIR field  
2345-7 (Glucose) ▾

REDCap Event  
Pre surgery visit (Arm 1: Arm 1) ▾

REDCap Field  
pre\_glu ▾

Date/time  
prelab\_date ▾

Preselect value  
Highest numerical value ▾

[Cancel](#) [OK](#)

## CDP Instant 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 purpose of adjudication is to ensure that the correct data values get imported. There are instances where extraneous data points may be pulled into REDCap from the EHR, but only some of them may be the desired.

REDCap Field	REDCap Date/Time	eStar Source Date/Time	REDCap Current Value	eStar Source Value	Import?
<b>Admin/Demo</b>					
<b>Comorbidities + Acute Illness</b>					
wbc_baseline "White blood cell count (cells/mm3)"	2018-07-04 (00:00)	2018-07-03 04:39		33.5	reset
		2018-07-03 13:08		31.6	reset
		2018-07-04 06:50		29.4	reset
plt_baseline "Platelet count (per microliter)"	2018-07-04 (00:00)	2018-07-03 04:39		24	reset
		2018-07-03 06:16		25	reset
		2018-07-03 13:08		29	reset
		2018-07-04 06:50		44	reset

The adjudication process within REDCap has recently improved. You can still adjudicate each value for any given field and is recommend for the first few times. Once satisfied in that the information being pulled from the EHR is accurate you can enable the new “instant adjudication” feature.

The instant adjudication allows adjudication of records in bulk and can only be enabled by users with adjudication rights (if you are not sure who has adjudication rights visit the “user rights” section). When using temporal data every source element must have an assigned date/time field and preselected strategy. These two things tell REDCap which retrieved value is appropriate for a given record. Once mapping configuration is correctly setup instant adjudication can be enabled.

**Clinical Data Pull from Epic**

The Clinical Data Pull (CDP) is a feature for importing data into REDCap from an EHR. It provides an adjudication process whereby REDCap users can approve all incoming data from the source systems before it is officially saved in their REDCap project. The first step in setting up the Clinical Data Pull (CDP) is to map the fields in your project to fields from the EHR. Once the fields have been mapped, REDCap will then know what data to import from the EHR and where to store it in the REDCap project.

The mapping process consists of two steps: 1) choosing source fields from the external source system whose data you wish to import into your REDCap project, and 2) map those source fields to REDCap fields in your project. Once the source fields are mapped, REDCap will then be able to import source data as soon as a record is given a value for its Source Identifier Field (e.g., medical record number). Data from the source system will be fetched immediately in real time on a data-entry form or on the Record Status Dashboard, and then it will also check the source system at regular intervals for any additional data. Tell me more

**SETTINGS**

Preview Fields (optional):  
Source system fields can be selected that will provide a quick preview of data from the source system when a user initially enters the value of the source ID field.

Default day offset (for temporal fields):  
When pulling temporal data (i.e. fields with an associated timestamp) from the source system, the day offset will be used in conjunction with the value of a mapped REDCap datetime field to create a window of time for searching for data in the source system. Only data within that window of time will be imported during the adjudication process. This helps to provide a buffer of time in the instance that the datetime value from REDCap and/or the timestamp from the source system lack some amount of precision.

Instant adjudication:  
Temporal fields may have multiple values returned from the external source system; once you set a "selected" value for ALL your mappings, you can enable "instant adjudication" and REDCap will skip the adjudicator table preview and save the best or most correct value.

**Instant adjudication**  
**Enabled** -  
2 temporal fields out of 2 are set.

**MAP SOURCE FIELDS TO REDCAP FIELDS**

External Source Field	Event	Field	Date/Time Field	Preselect Strategy	Actions
id Source Identifier Field: Medical record number	Enrollment	mrn MRN (Subject Enrollment)			[OK] [X]
problemList Problem list and health concerns (if available)	Enrollment	problemList Problem List (Subject Enrollment)			[OK] [X]
birthDate Date of birth (Demographics)	Enrollment	dob Date of birth (Subject Enrollment)			[OK] [X]
17884 Calcium [Mass/volume] in Serum or Plasma (Laboratory)	Pre surgery visit	preCa Calcium (Pre-surgery visit)	preCa date Date of labr. (Pre-surgery visit)	Nearest value (based on timestamp)	[OK] [X] [B] [R]
31413 Body weight (Other Input)	Enrollment	weight Weight (Subject Enrollment)	date_enroll Date subject signed consent (Subject Enrollment)	Nearest value (based on timestamp)	[OK] [X] [B] [R]

[Find more source fields to map] [Save] [Cancel]

Once you enable instant adjudication REDCap will automatically adjudicate the data being pulled from the EHR without the need for manual review.

Once activated users with adjudication rights will be able to select an adjudicate button from the record status dashboard. This button allows all records to adjudicate in mass. No more adjudication one record at a time. There is also an option to adjudicate in the background. Selecting this allow the adjudicating process to occur behind the scenes without the need for a user having to watch the progress screen.

**Instant adjudication is enabled**

There are 21 records with 34 values ready to be adjudicated in this project. Click the button below to start the instant adjudication process.

**Adjudicate** -

Adjudicate in background process

Send me an email when completed

Study ID	CDP New Items From Epic	Enrollment		Pre surgery visit
		Subject Enrollment	Health eConsent	
1 (00117292) Test, Dave	1	[OK]	[OK]	[OK]
2 (010003435) Test, Daphne	2	[OK]	[OK]	[OK]
3 (010009204) Test, Admizar	1	[OK]	[OK]	[OK]
4 (010006836) Jenkins, Sophie	2	[OK]	[OK]	[OK]
5 (010002133) Badger, Honey	2	[OK]	[OK]	[OK]
6 (010005972) Smith, B.P.B.	1	[OK]	[OK]	[OK]
7 (010005758) Zorac, Four	2	[OK]	[OK]	[OK]
8 (010009888) Jenkins, Sophie	2	[OK]	[OK]	[OK]
9 (010007082) Test, Admizar	2	[OK]	[OK]	[OK]
10 (010002296)	1	[OK]	[OK]	[OK]

**Adjudicating data**

REDCap is adjudicating the pending data stored in the database using the CDP mapping configuration

34 / 34

Adjudicated values: 14  
Excluded values: 234  
Unprocessed values due to error: 0

Processing record ID 44

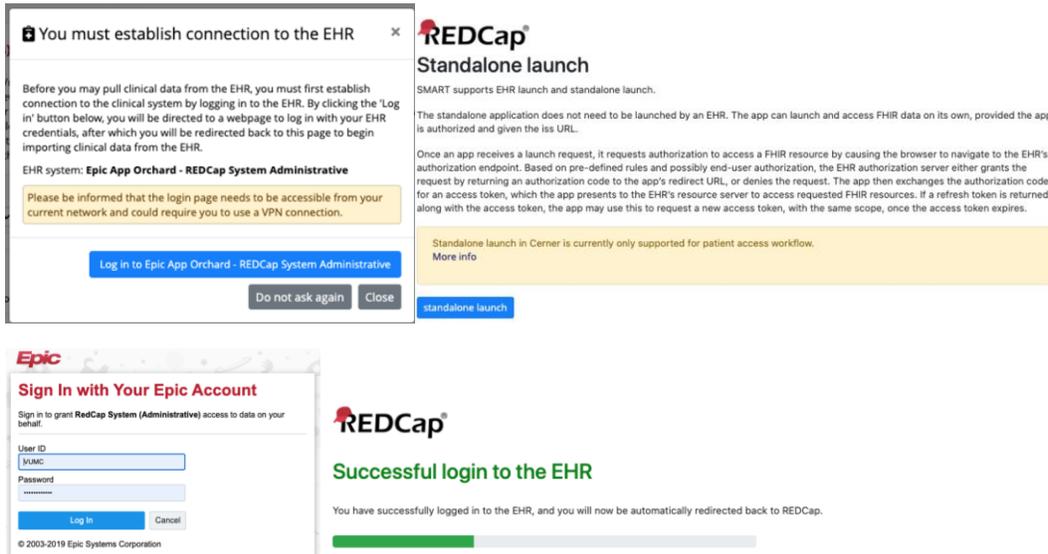
Successful adjudications: 39  
Errors: 0

No Errors

[cancel]

## Stand Alone Launch

As of REDCap 9.5.2, users are no longer required to launch the REDCap window embedded in the EHR (it is only optional). The standalone launch allows a user to log directly into an EHR from within REDCap. When a user attempts to pull data for a given patient the Standalone launch will automatically open. The images below show examples of the screens a user may see. More information can be found in “Setup instructions and technical specifications (ZIP)” in the REDCap control center.



## EHR Launch

The “EHR Launch” refers to launching a REDCap window from inside the EHR interface. If you would like to do an EHR launch, users will need to log into the EHR and navigate to a patient’s record. Once in the record there will be a REDCap specific icon which opens a window that lists the REDCap projects in which CDP is enabled. From this window you can choose to view the patient’s record inside a given project or (if already added to the REDCap project) or add the patient by clicking the “add patient” button next to the project name. 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 be added to the adjudication table when the “Add patient” button is clicked. If you navigate 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 REDCap record, you may perform typical data entry operation as one normally would in REDCap. *Note: The EHR Launch must always be the first step before using “Clinical Data Pull” because the launch itself initiates a user’s authorization process for the FHIR services. 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).* For more information on how to set this up please refer to the “Setup instructions and technical specifications (ZIP)” in the REDCap control center.

## Access Token Generation

Detailed instructions can be found in the “Setup instructions and technical specifications (ZIP)” in the REDCap control center. The access token is a temporary API key and is what will be used when making FHIR requests to the EHR later to export patient data. To receive the access token the EHR calls the REDCap “Redirect URL” which is provided on the “Clinical Data Interoperability Services” setup page in the REDCap control center.

**Redirect URL (to add to your FHIR app/client for REDCap)**  
Copy and paste the Redirect URL below and provide it to your EHR technical team to be added to your FHIR app/client.

**Redirect URL (read-only):** [Redacted]

**Clinical Data Pull "Instant Adjudication" option**  
This option allows users to enable the Instant Adjudication feature for all CDP-enabled projects. Once enabled here for the whole system, this setting can be enabled on the CDP projects field mapping page, after which it will allow users to bypass the normal data adjudication process and will let them import and save all data into the project that has already been cached from the EHR system. This can save a great deal of time when importing lots of patient records. After Instant Adjudication is enabled in a CDP project, users with CDP-adjudication privileges will see the button to initiate this process on the Record Status Dashboard. After the button is clicked, it will begin adjudicating the EHR data for all records in real time.

**Enable Instant Adjudication for all CDP projects?** Enabled

**EHR-specific and FHIR-specific settings**

**Client ID and Client Secret for the FHIR app/client created for REDCap in the EHR**  
These are essentially a username and API key that REDCap will use to communicate with your EHR using the SMART on FHIR services. These client values will likely need to be generated for you by your EHR's technical team.

**Client ID:** [Redacted]  
**Client Secret:** [Redacted] [Show secret](#)  
(Make sure that the Client Secret is the secret value itself and not the stored hashed value of the secret.)

**Authorization type for obtaining FHIR access tokens**  
Allow EHR user-level login from inside REDCap using Star

The Client Credentials Authorization flow uses system-level access credentials to interface with the EHR when performing authorization and fetching FHIR tokens. However, the Standard Authorization Flow requires a user-level EHR login to establish connection to the EHR. If using Epic or Cerner, the Standard Authorization Flow is recommended.

**FHIR web service URLs**  
The base URL endpoint should have been provided to you by your EHR's technical team.  
NOTE: The URL will not end with /metadata but typically similar to /FHIR/DSTU2/.

**FHIR Base URL:** [Redacted]

The token and authorize URLs can often be found using the base URL you have provided above and then by clicking the "Auto-find" button below. If the Auto-find method is not successful, then the Token URL and authorize URL below will need to be provided to you by your EHR's technical team. [Auto-find token URL and authorize URL](#)

**FHIR Token URL:** [Redacted]  
**FHIR Authorize URL:** [Redacted]

The EHR redirects the user to the REDCap Redirect URL via a secure SSL/TLS connection. REDCap then receives this request from the EHR and calls the EHR's FHIR/authorization server. REDCap then redirects the user to the authorize end-point URL on the FHIR/authorization server, and it sends the launch identifier that was initially provided by the EHR. The authorize end-point will validate the launch identifier and redirect the user back to REDCap's Redirect URL. REDCap then exchanges that authorization code for an access token by making a POST request to the FHIR/authorization server's token end-point. This access token does have an expiration time (typically one hour or less), and after that expiration time has passed, the token will no longer be viable for exporting clinical data. However, the setup of the EHR/FHIR functionality in REDCap requires that Refresh Tokens be enabled, which means that any expired token can easily be swapped for a new token by making another request to the FHIR/authorization server's token end-point. After a user completes the authorization process and receives an access token, the token is stored in REDCap's database to be used at any point afterward for exporting clinical data from the EHR via the FHIR web services. When the token expires, which is EHR dependent, REDCap can automatically refresh the token at any time so that REDCap will always be able to pull data via Clinical Data Pull from the EHR.

