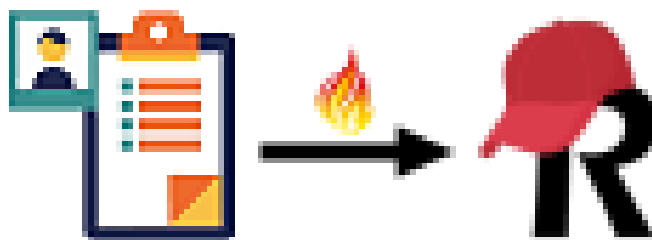




# **REDCap's Clinical Data Interoperability Services (CDIS) Operating Manual**



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*Disclaimer:*

*Joining the REDCap consortium is not the typical vendor experience. While we provide the REDCap codebase to your local IT folks to install and launch on your local servers, only your local team would know which settings they have made available. Similarly, only your local EPIC team knows how EPIC is set up at your site. The information in this manual is based on Vanderbilt's installations but should be generalizable across many of the REDCap/EPIC sites. While we will try our best to support sites working with Cerner, we may have to refer you to other consortium members who have already set CDIS up at their sites.*

**Prerequisite Thoughts**

The introduction of CDIS into your site's REDCap application is likely going to be driven by either the REDCap Admin or user requests to get EHR data into REDCap more easily. As a REDCap Administrator, you will likely need to drive the bus on this and find the appropriate stakeholders to aid in decision-making. These stakeholders might likely be your supervisor, the CMIO or CIO, IRB director, EHR director, the Director of Biomedical Informatics and other REDCap Administrators in your organization. You should meet and discuss the rules for using CDIS prior to initiating the set up. You may want or need a separate logging process to track and manage CDIS projects.

**Considerations:** These are things a REDCap administrator should think about. Answering these questions may require IRB or another governing body support.

How should CDIS be supported? How will people request this feature to be turned on?

Who can use this function? Will this feature only be allowed for Research, or will we also allow for Operation projects?

What rules need to be put in place before using CDIS?

**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 (CMP).

## What is Clinical Data Pull (CDP)

Formerly called Dynamic Data Pull (DDP) on FHIR (Fast Healthcare Interoperability Resources). CDP is a special feature for importing information from the EHR into an existing REDCap project either manually in real time or automatically at a regular interval. 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 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. Ex: clinical trials, IITs, etc.

This feature can only be enabled by a REDCap Administrator please refer to the [YUMC/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)

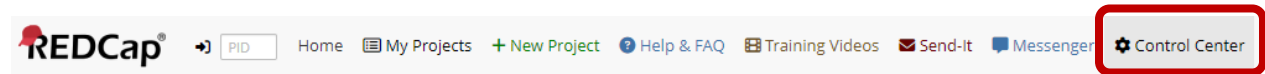
CDM is a special feature in which data can be fetched in bulk from an EHR system into a REDCap project. CDM must be initiated on the project creation page and the ability to create a CDM project is managed through the REDCap user profile. To retrieve the desired data a fetch request must be created and 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 and need to pull an EHR system dataset once and then never update the dataset or only update rarely.

This feature can only be enabled by a REDCap Administrator please refer to the [YUMC/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.***

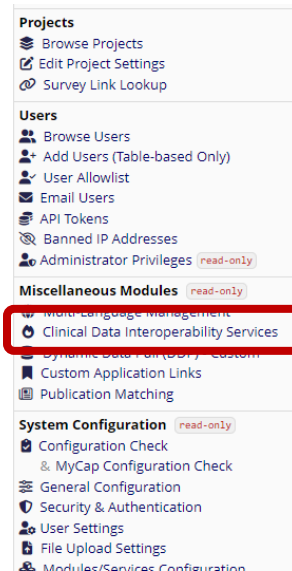
## **CDIS Documentation and FAQ**

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

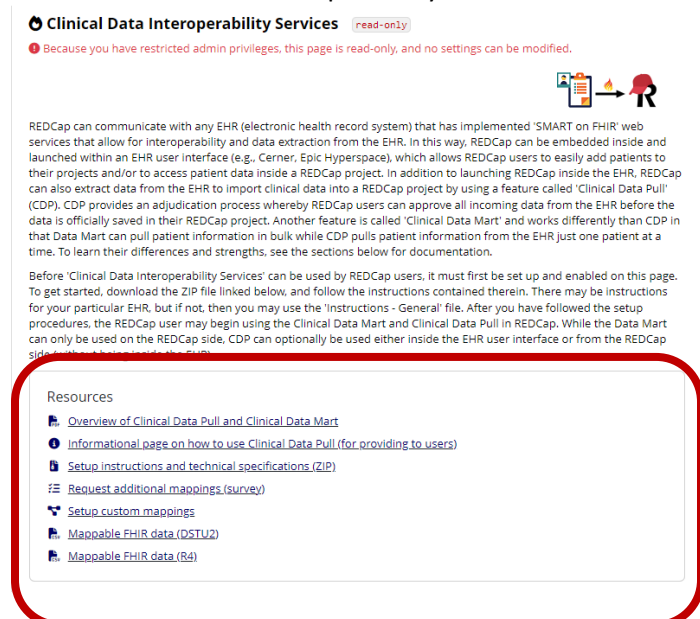
1. Login to REDCap and click on “Control Center” at the top of the REDCap home page.



2. Go to “Miscellaneous Modules” on the left-hand side and click on “Clinical Data Interoperability Services”. Be sure to carefully read all the documentation provided in the Control Center.



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



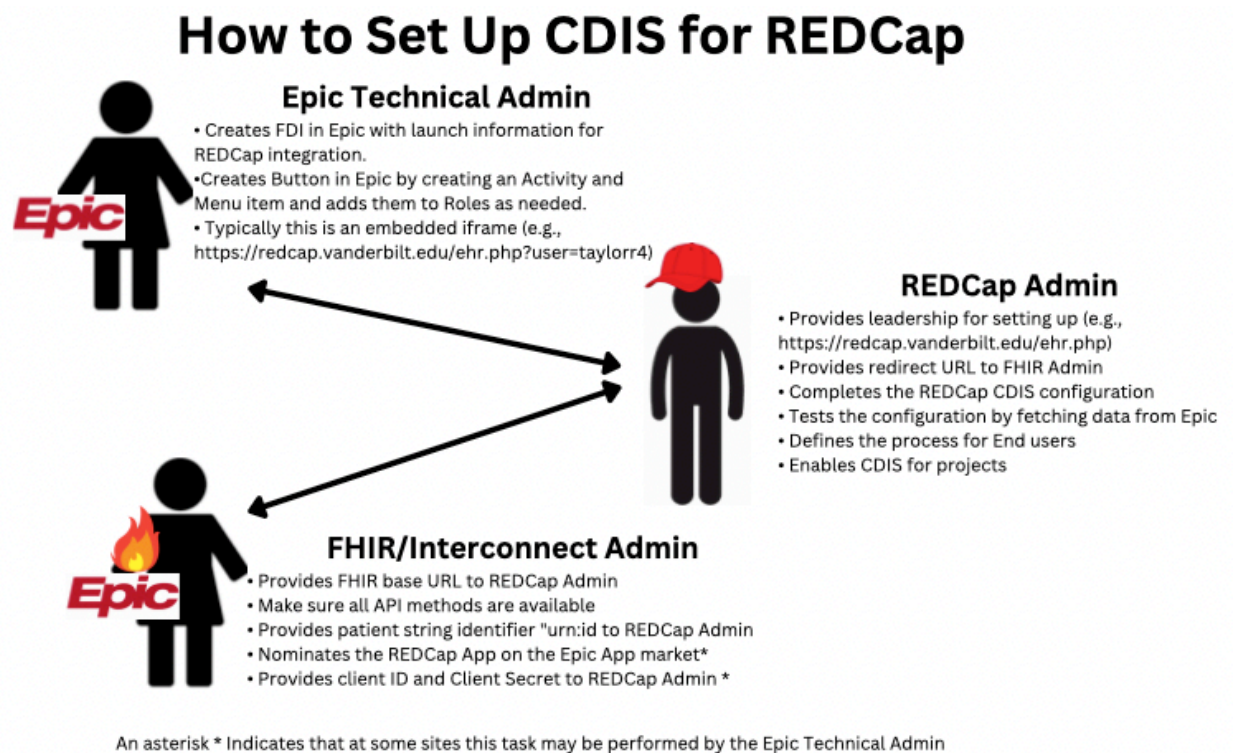
**Below are some frequently asked questions about the CDIS feature:**

1. Can I get data from the EHR in real-time?
  - a. Yes, when you enable CDIS the transfer clinical data from the EHR into REDCap is in real-time.
2. What can be imported from the EHR into a REDCap field?
  - a. Demographics: includes address (street address, city, state, postal code, country), date of birth, first and last name, home and mobile phone numbers, 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
  - g. Adverse Event (Research Related Only)
  - h. Core Characteristics (Gestational age at birth and Birth Weight)
  - i. Encounter List
  - j. Immunization
  - k. Appointments
  - l. Scheduled Surgeries
  - m. Dental Findings
  - n. Genomics
  - o. Infections
  - p. Medical History
  - q. Reason for visit
  - r. Insurance Coverage
  - s. Implants
  - t. Procedures
3. How do I request the CDIS feature?
  - 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. [Here](#) is an example of Vanderbilts request survey.
4. If I am a Vanderbilt user that would like to learn more about CDIS, where would I go?
  - a. User [FAQ page](#).
  - b. Attend one of our monthly virtual seminars.  
Specific topics include:
    - i. CDIS activation process (specific to Vanderbilt REDCap users).
    - ii. Proper REDCap project setup to use CDIS.
    - iii. Adding patient to a CDIS project.
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 toward REDCap Administrators, who are trying to set up CDIS. You will need to make sure that your institution has a valid REDCap license, and you will likely 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 that document for in-depth instructions.



It is not a terribly difficult setup if you can get these three people in the room. The biggest time constraint revolves around competing health IT priorities. The main takeaway from this graphic 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 there is a global REDCap application in Epic’s “[Connection Hub](#)”. 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. If you plan to launch REDCap directly in Epic the next step is for the EHR contact person to 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. If you don’t plan to launch REDCap inside the EHR then you can use the standalone launch feature within a REDCap project to start the fetching process.

Please note that as the REDCap Administrator, you may decide to do a softer rollout by enabling only the CDP portion until you get the hang of supporting just that service. Then later you can enable the CDM to begin to understand that process.

### String Identifier Verification/Location

#### 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.

urn:oid:1.2.840.114350.1.13.478.3.7.5.737384.14

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 item in the Epic ID Type Record (IIT) specified in the Patient ID Type field of the Integration Configuration Record (FDI).

### 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

This can be found in the "Information page on how to use Clinical Data Pull" document in the REDCap Control Center.

### Key Differences Between CDP and CDM Page

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

	Clinical Data Pull	Clinical Data Mart
<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</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.,</li> </ul>



	<p>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.</p> <ul style="list-style-type: none"> <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 field (if mapped).</li> </ul>	<p>chooses specific MRNs, date range, and data fields from the EHR.</p> <ul style="list-style-type: none"> <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>
<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</li> </ul>	<ul style="list-style-type: none"> <li>Date Mart will only pull data from the EHR when a user with appropriate privileges clicks the "Fetch clinical data"</li> </ul>

	<p>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.</p> <ul style="list-style-type: none"> <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 project.</li> <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>button. There is no cron job to pull any new data at other times automatically.</p> <ul style="list-style-type: none"> <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 instruments are modified, it may prevent the data pull from working successfully thereafter.</li> </ul>
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### **VUMC/VU Activation Process**

Please note that this process is specific to Vanderbilt and should only be used as an example. If a REDCap user is outside the Vanderbilt system, then please refer to your institutional policies.

At Vanderbilt we allow all users to create their own REDCap projects. This is not the case at all 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 the CDIS external module.

### **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 the CDIS module if your project is for research purposes.

1. The study must have an active IRB protocol. You will need to ensure that the template language for using CDIS is in the protocol. If you have not submitted the protocol to the IRB then you can add this in before the initial submission. If you have already submitted the protocol to the IRB then you will need to have an approved amendment. This must be done before you submit the activation survey.
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.
4. 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.

If you are using CDIS for operational support, then you will still need to ensure proper 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 comply 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 enable 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.

At VUMC we have a couple different locations in which a user can find this survey. The first is from the [CDIS FAQ page](#) that was created using a REDCap dashboard.

The second is on the Project Setup page under the “Enable optional modules and customization”. The “?” next to “Clinical Data Pull from eStar” and then click on “CDP request survey” is customizable from the within the REDCap control center under the Clinical Data Interoperability Services section.

**Clinical Data Pull from eStar**

[VIDEO: Clinical Data Pull \(CDP\)](#)

**Please read this entire section BEFORE requesting CDP.**

The Clinical Data Pull from eStar (CDP), formerly known as “DDP on FHIR with EHR Launch”, is a special feature that imports clinical data into REDCap.

CDP can be used only for research purposes. To learn more about this feature, please explore this popup or review the CDP page on our [User FAQ page](#).

When you are ready to proceed, submit the [CDP request survey](#).

(NOTE: CDP is NOT required if you want to enter clinical data into REDCap. That can always be done manually or via the Data Import Tool. CDP is an optional feature, most useful for REDCap projects requiring frequent updating of clinical data in many REDCap fields/records.)

**What is 'Clinical Data Pull' (CDP)?**

Clinical Data Pull is a special feature for importing data into REDCap from an EHR (electronic health record system), such as Epic, Cerner, etc. It provides an adjudication process whereby REDCap users can approve all incoming data from the EHR before it is officially saved in their REDCap project. Clinical Data Pull can only be enabled by a REDCap Administrator, so you should contact them if you wish to utilize Clinical Data Pull for this project.

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)”.

The screenshot shows two panels from the REDCap administration interface. The top panel, titled "Enable optional modules and customizations", has a gear icon and a status of "Optional". It contains a list of modules with "Enable" or "Disable" buttons and a green checkmark indicating they are enabled. The modules are: Repeating instruments, Auto-numbering for records, Scheduling module (longitudinal only), Randomization module, and Designate an email field for communications (including survey invitations and alerts). Below these is a button for "Additional customizations". A red box highlights the "Clinical Data Pull from eStar" option, which is currently disabled (grey button) and has a green checkmark. The bottom panel, titled "Set up Clinical Data Pull from eStar", has a circular arrow icon and a status of "In progress". It contains a paragraph explaining the first step in setting up the CDP. A red box highlights the "Go to Set up mapping for Clinical Data Pull (CDP)" link.

**Enable optional modules and customizations**

Optional

I'm done!

Enable Repeating instruments ?

Disable Auto-numbering for records ?

Enable Scheduling module (longitudinal only) ?

Enable Randomization module ?

Enable Designate an email field for communications (including survey invitations and alerts) ?

Additional customizations

Settings displayed to Administrators only:

Disable Clinical Data Pull from eStar ?

Enable Twilio SMS and Voice Call services for surveys and alerts ?

**Set up Clinical Data Pull from eStar**

In progress

I'm done!

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](#)

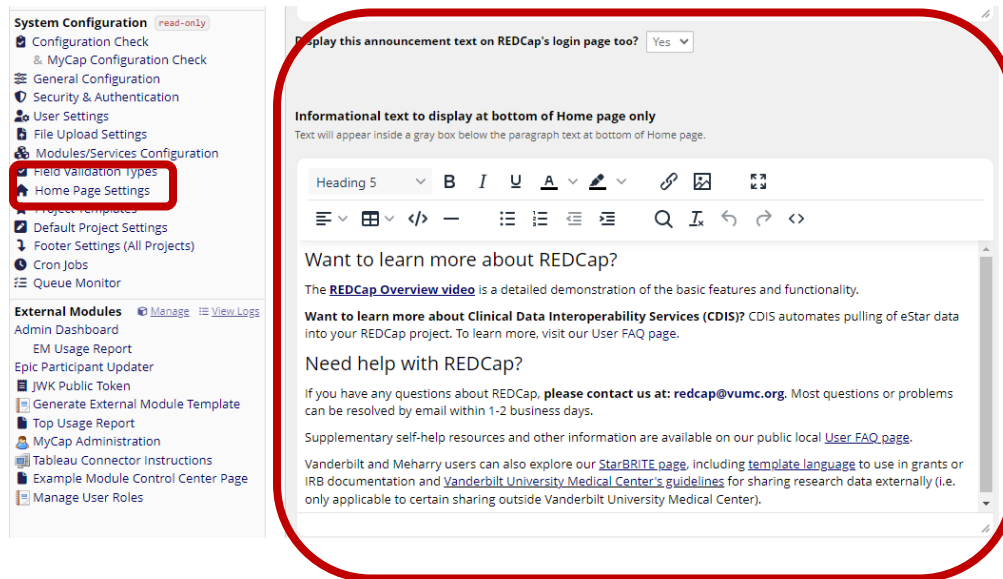
Go to Set up mapping for Clinical Data Pull (CDP)

### User support:

The Vanderbilt team has several ways in which we support our REDCap users. This is all located in an easily accessible area on the REDCap home page. Below is a screenshot of what the Vanderbilt information section looks like in REDCap.

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.

These settings are found in the control center under “Home Page Settings” → “Informational text to display at bottom of Home page only.”



User support services include:

- From REDCap our users can send an email to the REDCap inbox with any general questions or questions pertaining specifically to CDIS.
- There is a FAQ page available to all REDCap users.
- Monthly virtual seminars are held for people to learn about CDIS.

### **CDIS Specific Features**

Once the CDIS Activation Survey has been filled out and a REDCap administrator has enabled the feature 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, 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 Helper**

Any project user who has access to the Clinical Data Pull will be able to access the CDP Mapping page. This is where you can see what data can be fetched for a given patient. ***Please note this process still limits the available data to only data in which the user already has access to in the EHR system.*** The “Mapping Helper” icon can be found on the left-hand tool bar while in the REDCap project. Once selected you will be directed to the mapping helper page.

## EHR Mapping Helper

The Mapping Helper utility will assist you in finding the fields in your EHR (electronic health record system) that you would like to utilize in your Clinical Data Pull project or Clinical Data Mart project. If you already have appropriate privileges for pulling data into REDCap from your EHR, you may enter a valid MRN (medical record number) into any of the tabs in the Mapping Helper to pull all the data for that patient for those data categories. Once the data is pulled, it will be displayed on the page for you to view. The EHR field names and LOINC codes will be displayed, thus allowing you to find the specific fields you need to use during the field mapping process of your CDP or Data Mart project.

**Please note**

Dates returned by FHIR systems are in Zulu military time.

Where applicable, the Mapping Helper will provide a "local" timestamp reflecting the timezone of the REDCap server (America/Chicago).

Home
Custom request

MRN

Date from

Date to

Fetch 21 resources

*no entries*

To use the mapping helper simply add an MRN that you know has the data you want and select fetch. Mapping helper is best used when you know of a patient that has had a certain lab test however you do not know the standardized LOINC code behind the Last test. You will be able to search for that specific patient MRN and what will be returned is that patient's lab tests where the mapping helper returns the test name along with the LOINC code associated with it.

### Mapping

The first step in setting up the Clinical Data Pull (CDP) is to map the fields in your project to data elements from the EHR. Once the fields have been mapped, REDCap will know what data to import from the EHR and where to store it in REDCap. A user on the mapping/setup page can choose any available fields from the external source system to map to one of their REDCap project fields. (Note: This assumes that the user has already created their data collection instruments and fields in their project.) There are two types of fields that may be mapped: 1) one-time data fields, and 2) temporal data fields. One-time data fields are those where data will only be stored one time in the source system, such as demography data. Conversely, temporal data fields are those where data may be collected many times over a period of time (e.g., labs, vitals, any kind of longitudinal data). When mapping temporal fields, you must also specify a REDCap date/datetime field that will be used for determining the window of time in which it should look when fetching data from the source system. It will determine the window of time in conjunction with the day offset value defined on the mapping page. For example, if the value of the mapped REDCap date/datetime field is 2001-11-29 and the day offset is 1 day, it will query the source system and return only data saved for the field from 2001-11-28 until 2001-11-30. Any source data outside of that range will be ignored during the adjudication process. It is important to note that the source data for a temporal field will NOT be fetched from the external source system UNLESS its associated REDCap date/datetime field has a value. Once a value is entered for the associated date/datetime field, source data will then be fetched for that temporal field. The following pages will show you a general overview of the mapping elements and process.

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're 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

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

### 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

This feature allows a user to bypass data adjudication of the data fetched from the HER system. We still recommend manual adjudication in the beginning to ensure that the correct data is being fetched.

## MAP SOURCE FIELDS TO REDCAP FIELDS

[Import](#) [Export](#)

[Find more source fields to map](#)

Use this if you know what values 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. As a best practice, you will want to first map the field that will provide the linkage between REDCap and the EHR. Generally, 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 to your EHR ID or MRN. Be sure to click the Save button frequently.



External Source Field	Event	Field
(★Source Identifier Field) <b>id</b> Medical record number	Baseline	<b>mrn</b> Medical record number (Demography)

The External Source Field or “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 “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/or delete the mapping. Remember to click “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 used 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 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.

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:  
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**

External Source Field	Event	Field	Date/Time Field	Preselect Strategy	Actions
<b>id</b> (★Source Identifier Field) Medical record number	Enrollment	<b>mrn</b> MRN (Enrollment)			<a href="#">Edit</a> <a href="#">Delete</a>
<b>problem-list</b> Problem list and health concerns (Enrollment)	Enrollment	<b>problem-list</b> Problem List (Enrollment)			<a href="#">Edit</a> <a href="#">Delete</a>
<b>birthdate</b> Date of birth (Demographics)	Enrollment	<b>dob</b> Date of birth (Enrollment)			<a href="#">Edit</a> <a href="#">Delete</a>
<b>17851-6</b> Calcium [Mass/volume] in Serum or Plasma (Laboratory)	Pre surgery visit	<b>pre_lab</b> Calcium (Pre surgery visit)	<b>prelab_date</b> Date of lab: (Pre surgery visit)	Nearest value (based on timestamp)	<a href="#">Edit</a> <a href="#">Copy</a> <a href="#">Delete</a>
<b>2141-9</b> Body weight (Vital Signs)	Enrollment	<b>weight</b> Weight (kilograms) (Enrollment)	<b>date_enroll</b> Date subject signed consent (Enrollment)	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**

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](#)

A common mapping pitfall is selecting an incorrect “External Source Field”. This could happen for any number of reasons, but it seems to happen more often when there is a mismatch in the naming convention between the EHR system and REDCap. In any case the mapping helper is a great tool for making sure you map the correct elements.



## CDP 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.

Adjudicate data from eStar

[View DDP adjudication instructions](#)

Fetching data for **Study ID "5"** using  $\pm 1$  days
Refresh data from eStar using  $\pm 1$  days from date AND time  
min: 0.01 days (15 minutes), max: 365 days

**New items: 26**    Time of last data fetch: just now   
☒ Display all items (all forms)   
☐ Display only this form's items   
[View 3 hidden items \(existing values\)](#)

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	<input type="radio"/> reset
		2018-07-03 13:08		31.6	<input type="radio"/> reset
		2018-07-04 06:50		29.4	<input checked="" type="radio"/> reset
plt_baseline "Platelet count (per microliter)"	2018-07-04 (00:00)	2018-07-03 04:39		24	<input type="radio"/> reset
		2018-07-03 06:16		25	<input type="radio"/> reset
		2018-07-03 13:08		29	<input type="radio"/> reset
		2018-07-04 06:50		44	<input checked="" type="radio"/> reset

## Instant Adjudication

The adjudication process within REDCap has recently changed. You can still adjudicate each value for a field, and we recommend that you do this for the first few times to ensure you are getting the correct data. Once you are satisfied that the information being pulled 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 you will need to 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 value is appropriate for a given record.

### Clinical Data Pull from EHR

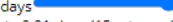
The Clinical Data Pull (CDP) is a feature for importing data into REDCap from an EHR. It provides an adjudication process whereby REDCap users can approve all incoming data from the source system before it is officially saved in their REDCap project.

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 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 later it will also check the source system at regular intervals for any additional data.

[Tell me more.](#)

 Mapping Helper

SETTINGS	
<b>Preview Fields (optional):</b>  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.	<b>Select preview fields from EHR (up to 5)</b> <div> <input type="text" value="name-given"/> <span>✕</span> </div> <div> <input type="text" value="name-family"/> <span>✕</span> </div> <div> <input type="text" value="birthDate"/> <span>✕</span> </div> <div> <span>➕ Add another preview field</span> </div>
<b>Default day offset (for temporal fields):</b>  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.	<b>Default day offset:</b> <div> <input type="text" value="±"/> </div> <div> <input type="text" value="365"/> </div> <div>           days  </div> <div>           min 0.01 days (15 minutes), max: 365 days         </div>
<b>Instant adjudication</b>  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.	<div> <b>Instant adjudication</b>  <input checked="" type="checkbox"/> Enabled <span>▼</span>            23 temporal fields out of 23 are set         </div> <div> <b>Auto-adjudicate</b>  <input type="checkbox"/> Auto-adjudicate all clinical data once a day             Enable “auto-adjudicate” and REDCap will automatically adjudicate fetched records in a background process         </div>

Once you enable instant adjudication REDCap will automatically adjudicate the data being pulled from the EHR without the need for you to manually 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 of 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

Adjudicating data

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

Adjudicated values: 14

Excluded values: 234

Unprocessed values due to error: 0

Processing record ID 44

Successful adjudications: 39

Errors: 0

No Errors

Study ID	CDP New Items from Epic	Subject Enrollment	Health Sciences eConsent	Pre-surgery visit
1 (000117383) Test, Dave	1	1	1	1
2 (010003408) Test, Stephanie	2	1	1	1
3 (070009304) Test, Admizar	1	1	1	1
4 (070006838) Jenkins, Sophie	1	1	1	1
5 (010005134) Badger, Honey	2	1	1	1
6 (010009870) Smith, Bill B.	1	1	1	1
7 (070006759) Zness, Four	2	1	1	1
8 (070009888) Jenkins, Sophie	2	1	1	1
9 (070007082) Test, Admizar	2	1	1	1
10 (070002296)	1	1	1	1

## Auto-Adjudication

Auto-adjudication works hand in hand with instant adjudication but is not required to be on. Auto-adjudication will automatically adjudicate fetched data in a daily background process, essentially taking the place of the last step of selecting the adjudicate button from the record status dashboard.

## Standalone Launch

The standalone launch gives users the ability to authenticate and get an access token through the REDCap interface. Once selected from the left-hand tool bar a EHR authentication redirect should occur (if it doesn't there may be an issue with your control center settings).

Clinical Data Interoperability Services

eStar

Standalone Launch

Mapping Helper

Messages

Valid access token

auto-login

break the glass enabled

**Epic**  
HYPERSPACE®  
February 2021

test

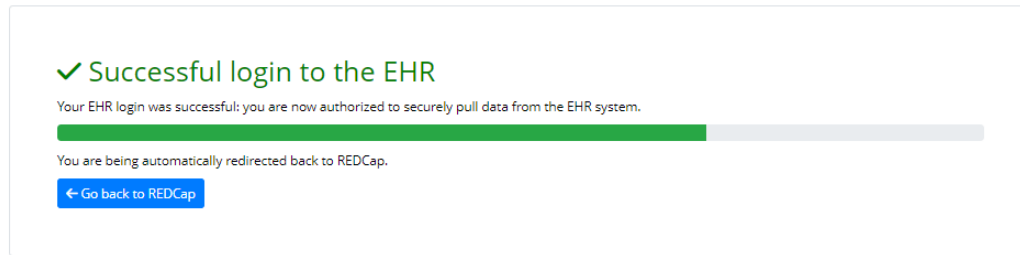
Password

Log In

Confirm External Access

Are you sure you want to grant VUMC REDCap App access to data on your behalf?

Grant Access Deny Access




## EHR Launch

The “EHR Launch” refers to launching a REDCap window from inside the EHR interface. As of REDCap 9.5.2, users are no longer required to launch the REDCap window embedded in the EHR (it is only optional). Instead, they may log in to the EHR directly from REDCap after being prompted in the REDCap user interface, after which they may immediately begin to pull clinical data from the EHR. Because of this upgrade adding the REDCap launch button inside your EHR is merely optional but is still recommended since it provides a very easy and streamlined way of adding new patients to a REDCap project while inside the EHR interface. For more information on how to set this up please refer to the “Setup instructions and technical specifications (ZIP)” in the REDCap control center.

If you would like to do an EHR Launch then you will need to log into the EHR and navigate to the patient’s record. Once you are in the record there will be a window that will list the REDCap projects that are CDP enabled for you to choose from. You can choose to view the patient’s record inside a given project or (if not yet added to the REDCap project) you can 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 added to the project 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 a 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, you may perform typical data entry operations 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 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).*

## Access Token Generation and Redirects

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.

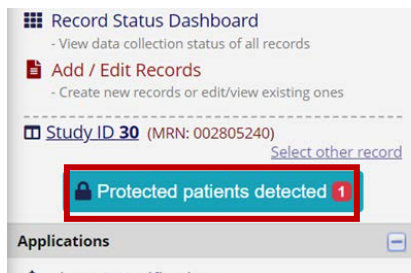
<p><b>Custom name for the EHR system</b></p> <p>This will be the name of the EHR system as it is displayed for the user. If left blank, it will simply say 'EHR' in its place.</p>	<input type="text" value="eStar"/> <small>e.g., Epic, Cerner, EMR, EDW</small>
<p><b>Redirect URL (to add to your FHIR app/client for REDCap)</b></p> <p>Copy and paste the Redirect URL and provide it to your EHR technical team to be added to your FHIR app/client.</p>	<input type="text" value="https://redcap.vanderbilt.edu/ehr.php"/>  <small>Redirect URL (read-only):</small>
<p><b>Client ID and Client Secret for the FHIR app/client created for REDCap in the EHR</b></p> <p>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.</p>	<p><b>Client ID:</b></p> <input type="text" value=""/> <p><b>Client Secret:</b></p> <input type="password" value=""/> <input type="button" value="Show secret"/>
<p><b>FHIR web service URLs</b></p> <p>The base URL endpoint should have been provided to you by your EHR's technical team.  <small>NOTE: The URL will not end with /metadata but typically similar to /FHIR/DSTU2/.</small></p>	
<p><b>FHIR Base URL:</b></p>	<input type="text" value=""/> <p><small>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.</small></p> <p><input type="button" value="Auto-find token URL and authorize URL"/></p>
<p><b>FHIR Token URL:</b></p>	<input type="text" value=""/>
<p><b>FHIR Authorize URL:</b></p>	<input type="text" value=""/>
<p><b>Identity provider (optional)</b></p> <p>The identity provider is used in the OAuth2 authorization process to identify the server that will exchange the FHIR access token with REDCap.</p>	<input type="text" value=""/> <p><small>Set this parameter only if the real FHIR base URL of your EHR system is different from the one specified in this page (e.g., your EHR system is behind a proxy).  More information about the launch sequence can be <a href="#">found here</a>.</small></p>
<p><b>EHR's patient identifier string for medical record numbers (optional)</b></p> <p>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.</p>	<input type="text" value="urn:oid:1.2.840.114350.1.13.478.2.7.5.737384.14"/> <small>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</small> <small><a href="#">Note for Epic customers: This is the HL7 Root item in the Epic ID Type Record (IIT) specified in the Patient ID Type field of the Integration Configuration Record (FDI).</a></small>

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 endpoint 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 endpoint. 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 endpoint. 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, 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.

## Break the Glass

"Break-the-Glass" is a feature that is unique to EPIC and refers to a quick means for a person who does not have access privileges to certain information to gain access when necessary. This will apply to the patients at Vanderbilt that have VIP status or are VUMC employees and will have a "Protected patients detected" window popup.



This will open a new window that is like what you will see when you "break the glass" in a patient's EHR record.

Verify that the medical record number is correct, select a reason from the drop-down menu (this is the same reason you will enter in the EHR), enter an explanation, the department number is the same as your eStar log in department number, and select the department type from the drop-down menu. Once this is complete hit the green "Break the glass" button and you will be able to access the patient's EHR information for a set period.

THIS MEDICAL RECORD IS MONITORED. Unauthorized access can result in the end of employment. You may VIEW but NOT DOCUMENT OR MODIFY content within your medical record or that of your minor child. Communicate with your provider through My Health at Vanderbilt, not the medical record.

**Medical Record Numbers** ⓘ Select all

☐ [REDACTED]

**Reason** ⓘ

**Explanation** ⓘ

**Department** ⓘ

example: 101000206 🔒 ⌵

**Department type** ⓘ

Internal ⌵

🟢 Break the glass ⌛ Cancel