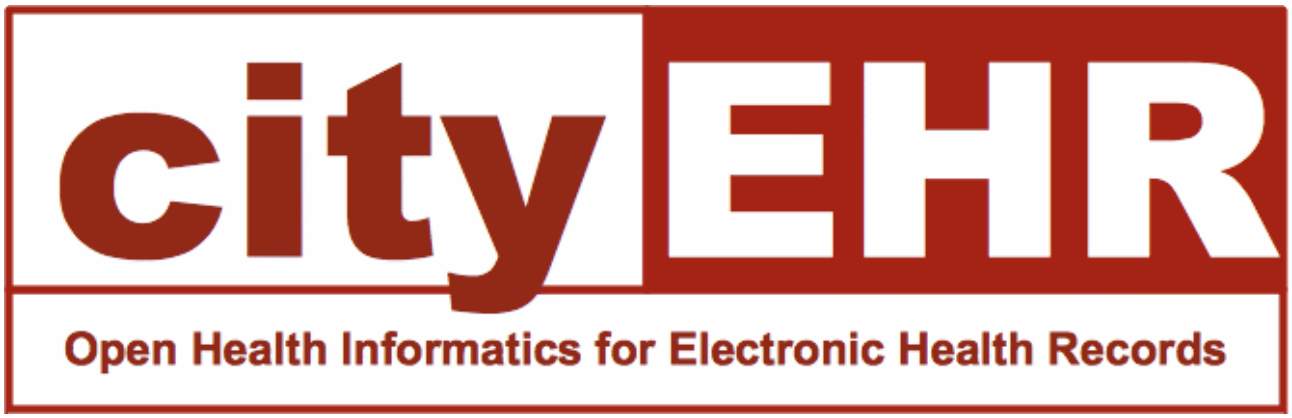

Quick Start Guide
Open Health Informatics

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5th October 2024

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Introduction

This document describes the basic setup and features of the cityEHR starting from a standard, out-of-the-box installation.

If you don't have an installation of cityEHR yet you should refer to the cityEHR Installation Guide.

If you have a standard installation running under Tomcat on your local machine, you can access cityEHR at *localhost:8080/cityehr*. For remote servers, replace '*localhost*' with the server's IP address.

cityEHR is an XML-based application that uses only declarative programming languages, including XHTML, XML, XForms, XSLT, and XQuery, ensuring simplicity and flexibility in customization.

The source code is located at *CATALINA_HOME/webapps/cityehr/WEB-INF/resources/apps/ehr*. Here, CATALINA_HOME refers to the base directory of your Tomcat installation.

If you have cityEHR installed with a different application server or you have changed the locations of the standard installation then you will need to find where the *resources/apps/ehr* directory is located in your installation.

The remaining sections of this Guide cover;

- Registering Patients
- Entering and viewing clinical data
- Annotating patient records
- Viewing and plotting historical data
- Finding patients
- Creating cohorts of patients and exporting their data

This guide also introduces key administrative functions, such as accessing user resources, generating test data, managing users, and creating export data sets. Note that only a subset of administration functions is covered here.

cityEHR is fully configurable, enabling clinicians to design secure, enterprise-scale health record systems that meet international standards while supporting locally defined data sets.

Additionally, this Quick Start Guide demonstrates how to create a new EHR system from scratch, including building the information model, configuring patient labels, defining search criteria, and establishing cohort selection terms.

Verifying the installation

This chapter ensures cityEHR is correctly installed and accessible. It guides users through logging in with default credentials, building the default application, and navigating the Dashboard to confirm the setup. Additional steps include reloading the default application, enabling debug mode to explore cityEHR's underlying structures, and managing session timeouts.

Log On

If cityEHR is installed on Apache Tomcat, you can access the log-on page using the Firefox web browser. On a local machine, use the URL: *http://localhost:8080/cityehr*. If running on a remote server, replace 'localhost' with your server's IP address.

Note that cityEHR 1.7 must be accessed using Firefox only (IE 11, Edge, Chrome and Safari will be supported from version 2.0 onwards).

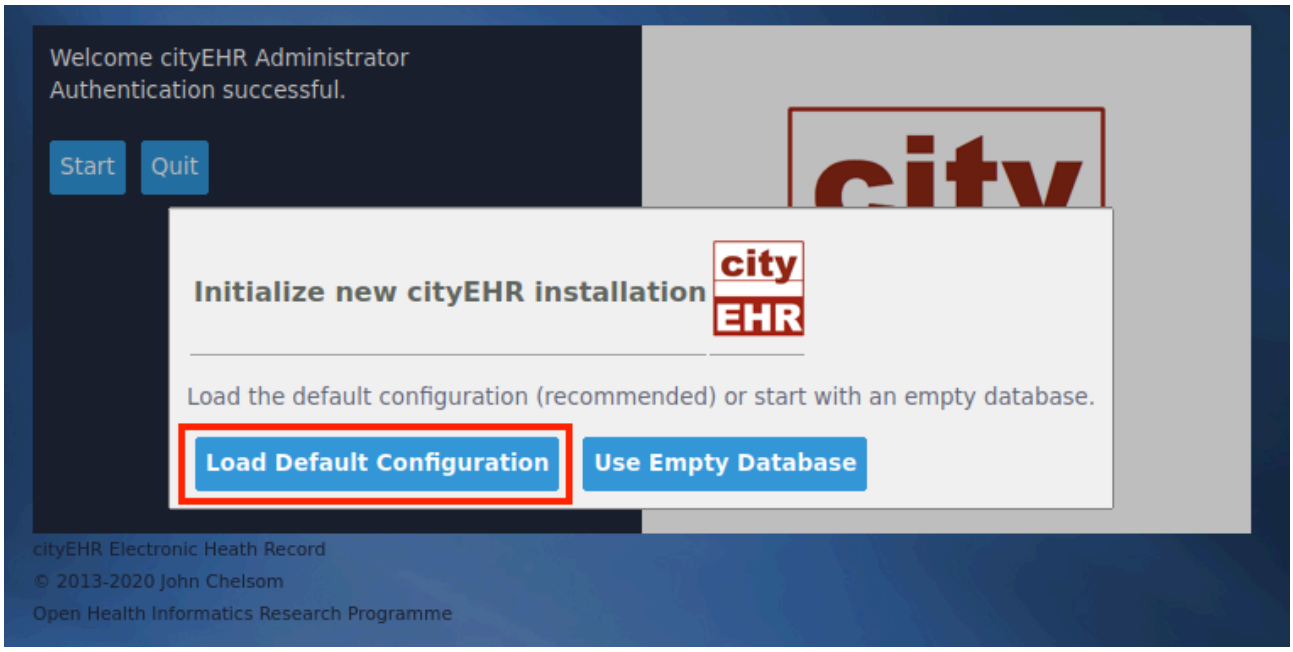
The base cityEHR installation has a single default user set up with the credentials;

username: admin

password: password

cityEHR Log-on Page

Upon your first log-on, cityEHR prompts you to build a default application. This process generates an example information model and configuration. Choose **'Build Default Application'** to proceed. Alternatively, you may start with an empty database, but note that some features (e.g., Dashboard elements) may not display without default information models.

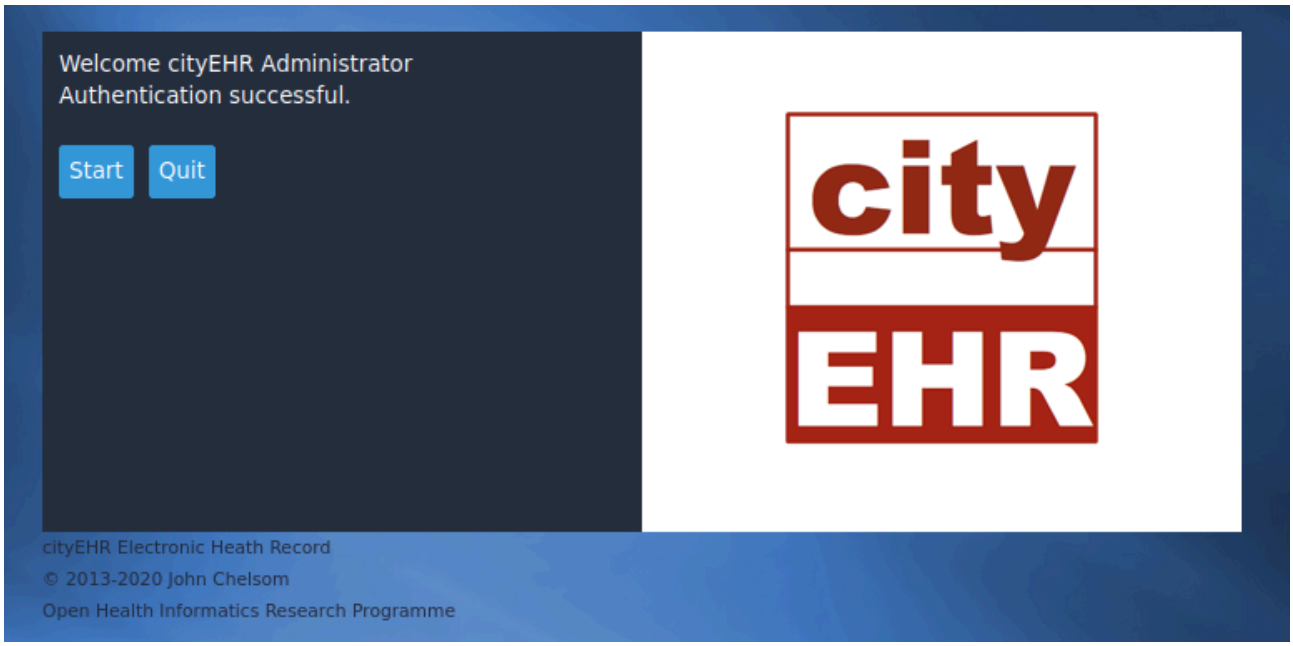


Initialize New cityEHR Installation

cityEHR will now run through a sequence of steps to build the default application; while this is in progress the screen will look like the one displayed in the Figure below. It take a minute or so for this process to complete, so you will need to wait while before continuing.

Default Application Sequence Steps

After the default application has been built during your first log-on, and for every other time you log on, the screen will be as shown in the Figure below, after you have authenticated:

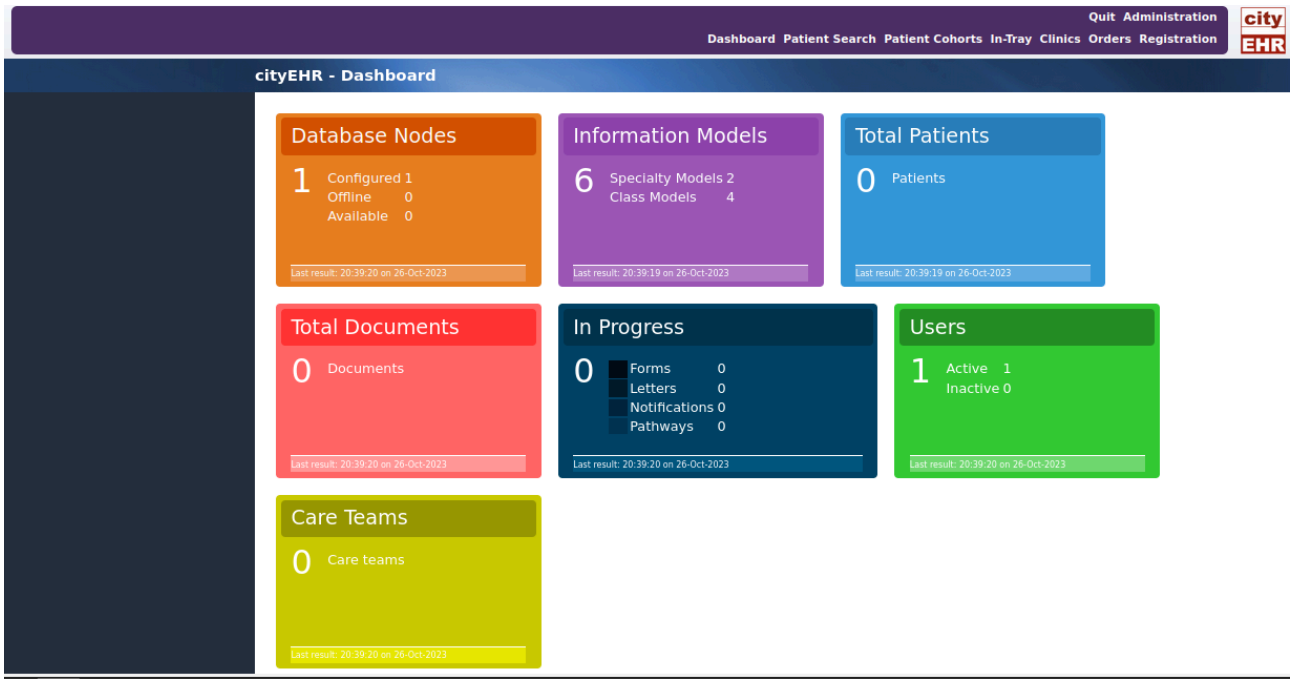


Post Authentication Page

Press the **Start** button to move to the default home page, which is pre-configured to be the dashboard page, as shown in the figure below

The Dashboard shows a summary of the overall status of the cityEHR application, which ships by default with the base installation. There is one user registered (the 'admin' user you logged in as) and no patients (so the total patients is zero, there are no clinical documents recorded and no documents in progress).

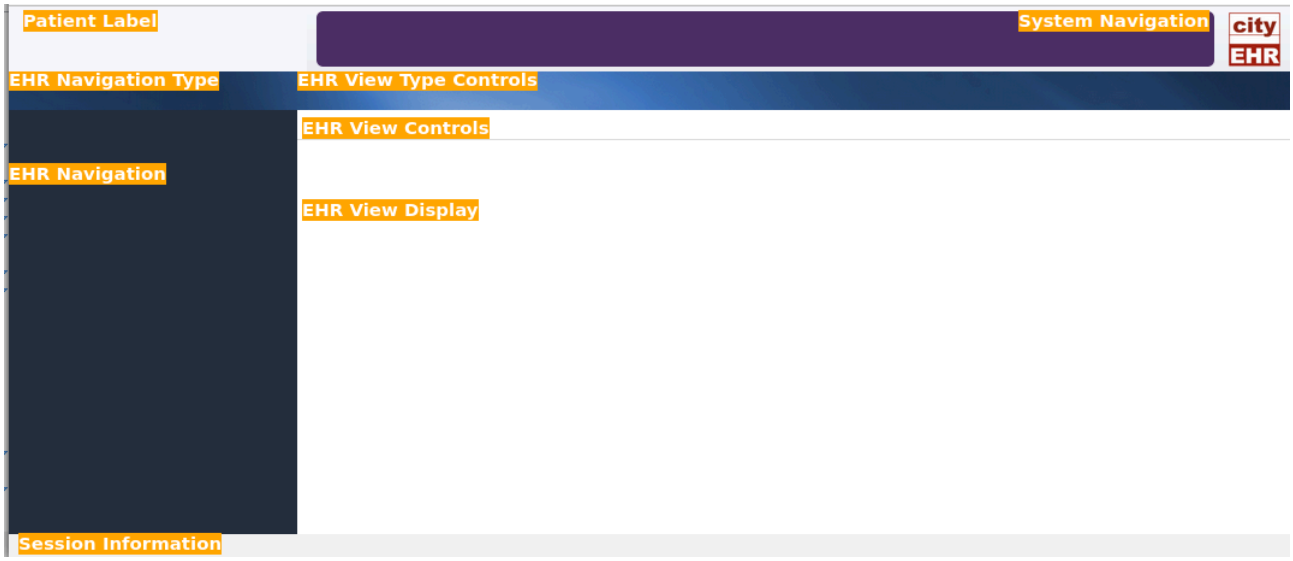
Note: The number of Information Models shown in the dashboard. If this number is zero (0) then the default application was not loaded properly when you ran cityEHR for the first time (probably because you selected to "Use Empty Database").



Default Home-page Dashboard

The Dashboard is your first glimpse of the pages in cityEHR, which can either be non-patient (like the Dashboard), cross-patient (ex. Patient Search page) or patient specific (view of the record for a patient, as identified in the Patient Label)

Whichever type, the general layout of all pages in the cityEHR system is the same, as shown in the figure below.



System Page Layout

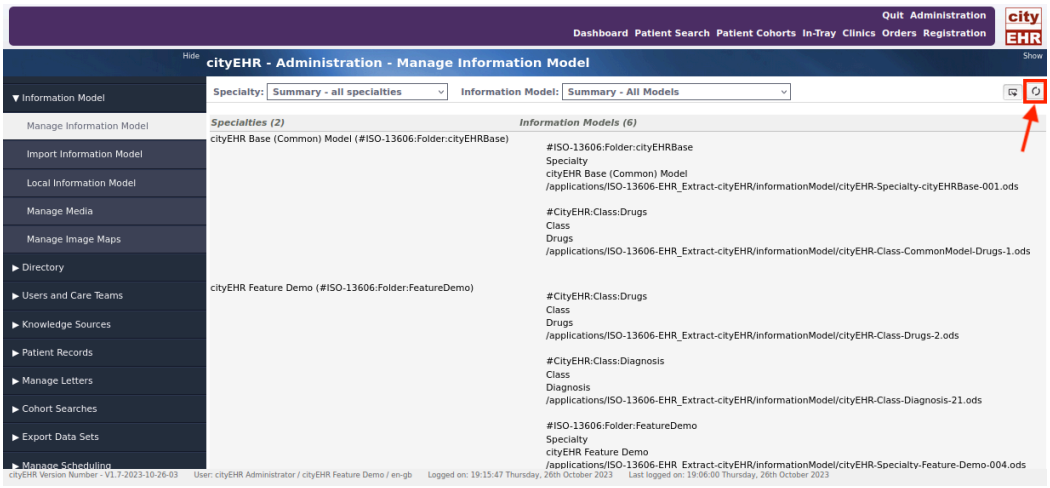
Reloading the Default Application

The default application can be reloaded from the information models shipped with the cityEHR system. You may need to do this if you selected to start with an empty database the first time you ran cityEHR (in which case the Dashboard will show the number of information models as 0) or if you changed the models and want to restore to the default.

To reload the default application;

1. Navigate to **Administration** in the system menu.
2. Select **Information Model** from the left navigation menu.
3. Click **Reload Shipped Models for This Application** in the top-right corner.

   Note: If you are reloading the models because you started with an empty database, you will not see the summary of Information Models.



Information Model Summary

4. In the Confirmation Dialog, select to **Reload**.

5. Now wait while the models are reloaded (which may take a few minutes) - progress is displayed in the main view.

Once completed, the progress display will be cleared and you should see a summary of the models as shown in the Figure above.

Running in Debug Mode

cityEHR features a debug mode that allows the user access to additional features that expose some of the underlying information structures such as HL7 CDA documents. Debug mode can be activated in two ways:

Single session:

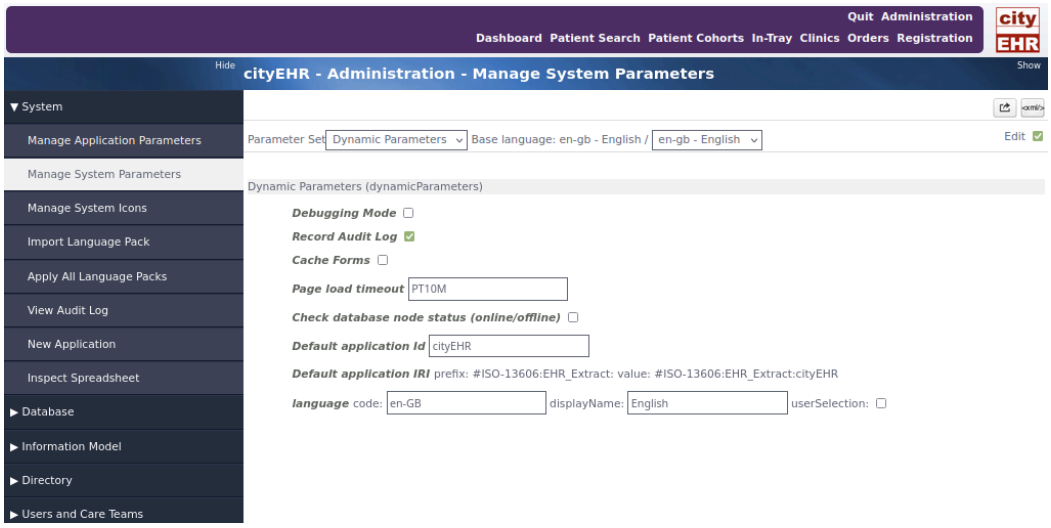
1. Add *?mode=debug* to the URL (e.g., *http://localhost:8080/cityehr/?mode=debug*).

Persistent Setting:

1. Navigate to **Administration** in the system menu.

2. Select **System Parameters** from the left navigation menu.

3. Enable **Debug Mode** by checking the corresponding box and saving changes.



Edit system parameters to set Debug Mode

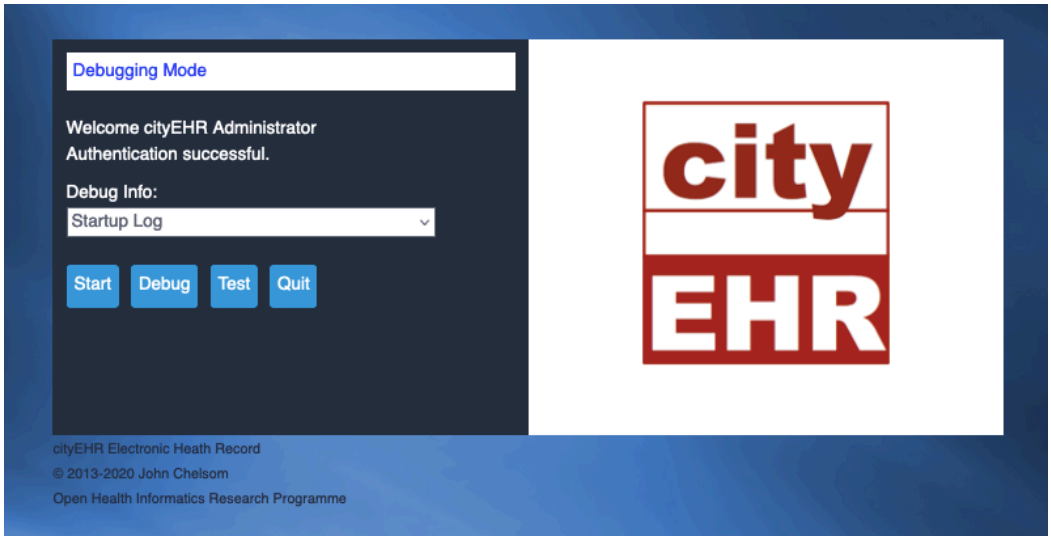
When operating in debug mode, cityEHR displays some additional action buttons and selections that allow you to explore the XML structures that underlie the configuration and clinical content (HL7 CDA).

You can now restart a new session in debug mode;

1. Press the **Quit** button in the system navigation.

2. Enter your credentials (admin / password) as usual and you should see an additional selection drop-down which you can use to view various cityEHR configuration parameters.

Note: the banner informing you that cityEHR will start in debug mode.



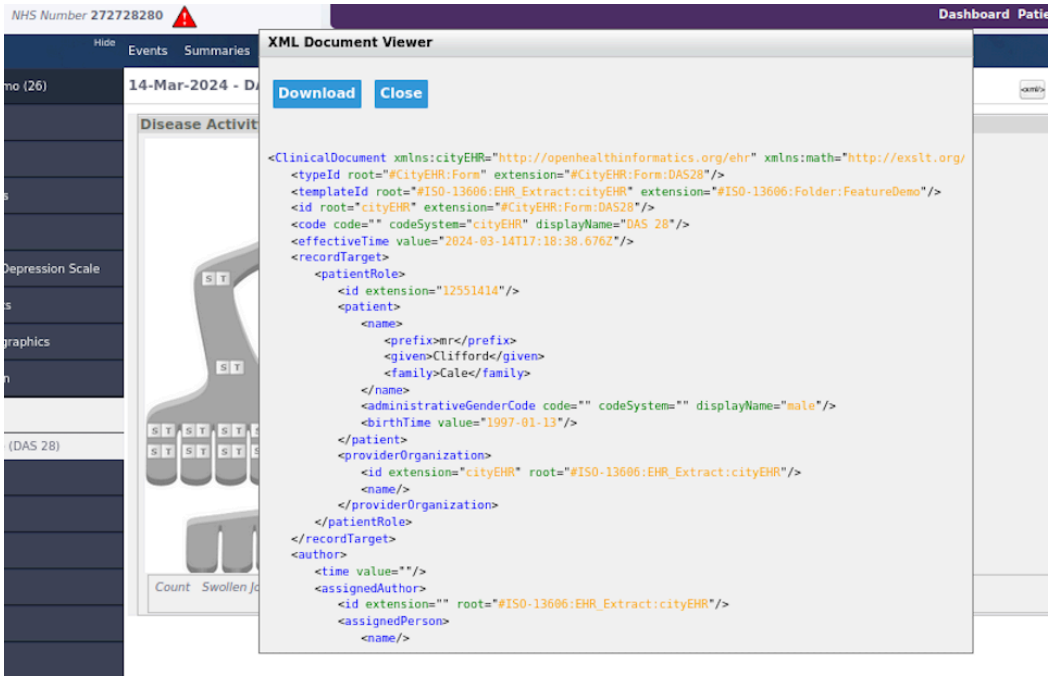
cityEHR start-up in Debugging mode

3. These are all represented as XML, so you can view directly in the system or select **Download** and view in a text editor, XML editor or any web browser.

On the Sign On page, as shown in the Figure above, various of the internal XML instances, built during the log on process, are available to view by selecting in the **Debug Info** drop-down and then pressing the **Debug** button.

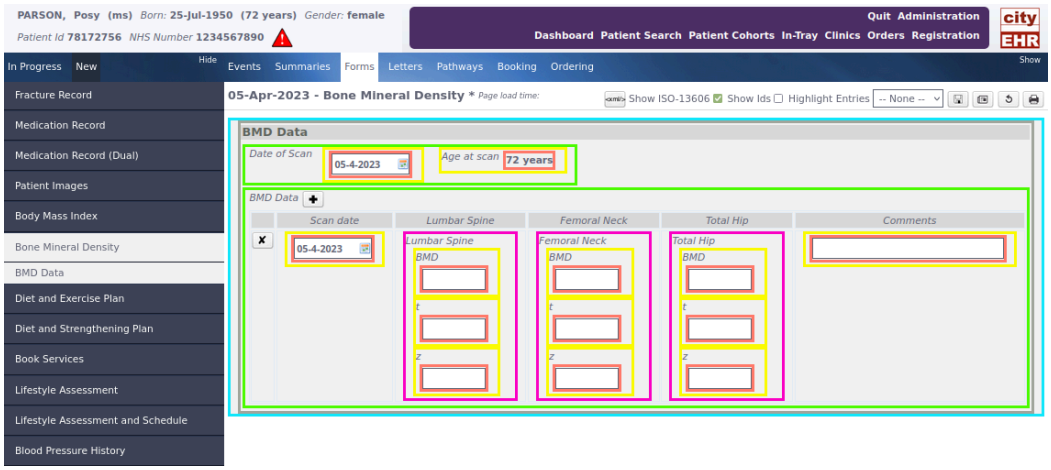
Features of Debugging mode;

- On patient-specific data input pages (Forms, Letters, etc) pressing the XML button within the view controls will bring up a dialog box with a listing of the current HL7 CDA document associated with the data input form. This dialog also has a button to Download the HL7 CDA XML.



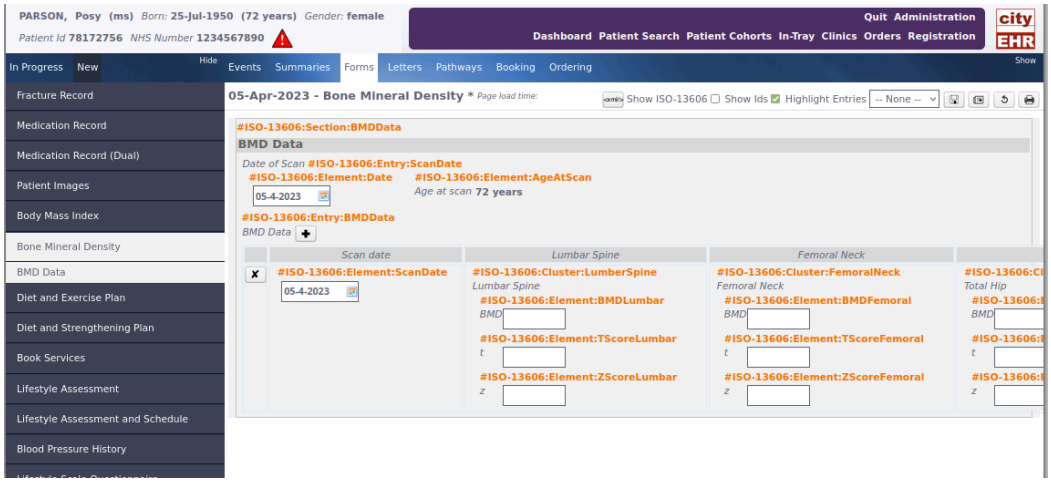
XML viewer open for DAS 28 Form

- On patient-specific data input pages are check boxes within the view controls to Display ISO 13606 structure.



Showing ISO 13606 Structure in Debug Mode

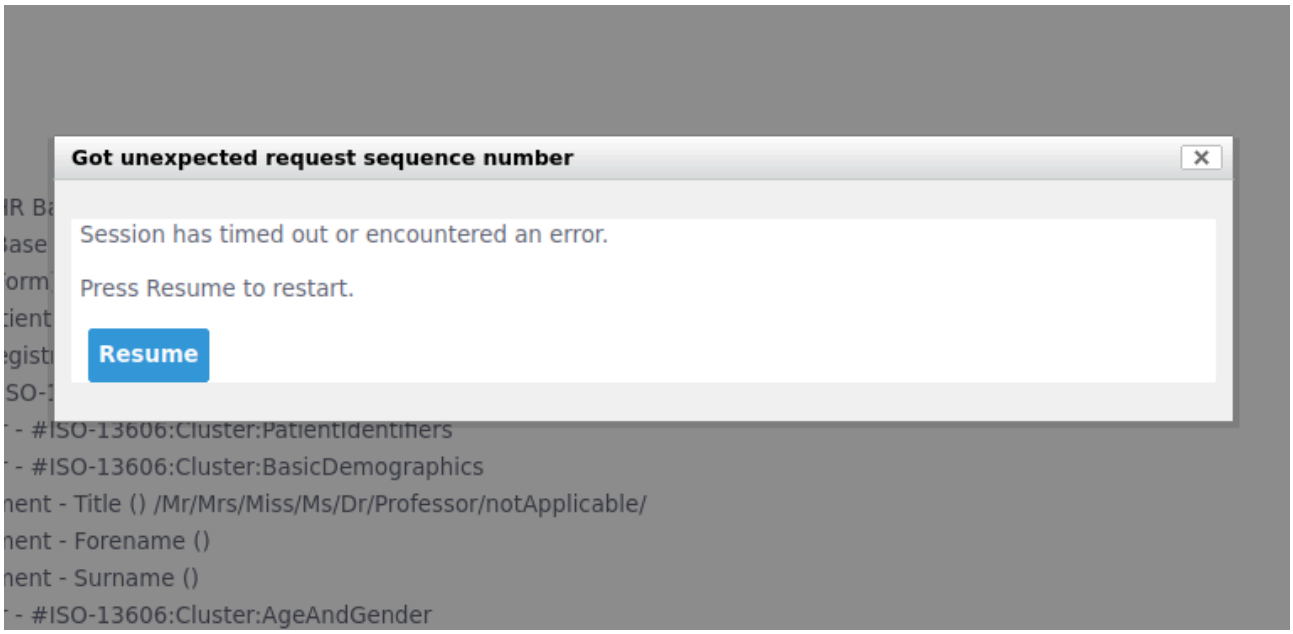
- View the Identifiers for the ISO 13606 components on the form by checking the **Show Ids** box within the view controls.



Showing ISO 13606 Component Ids in Debug Mode

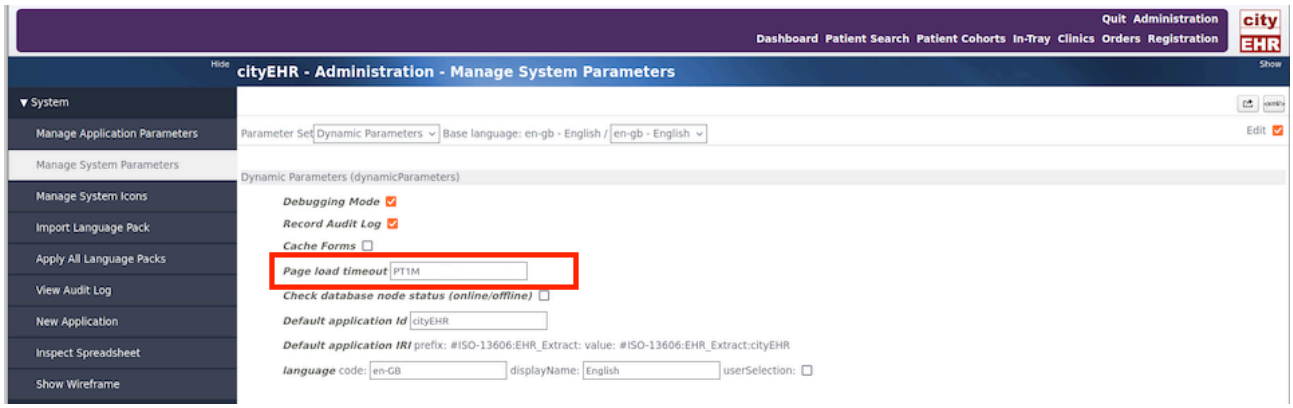
Session Time Out

The cityEHR session is set to time out after a period on inactivity – this is controlled by the underlying session management of the Tomcat Application Server. If such a timeout occurs you will see an error dialogue which allows you to restart the application.



Session Time Out Dialogue

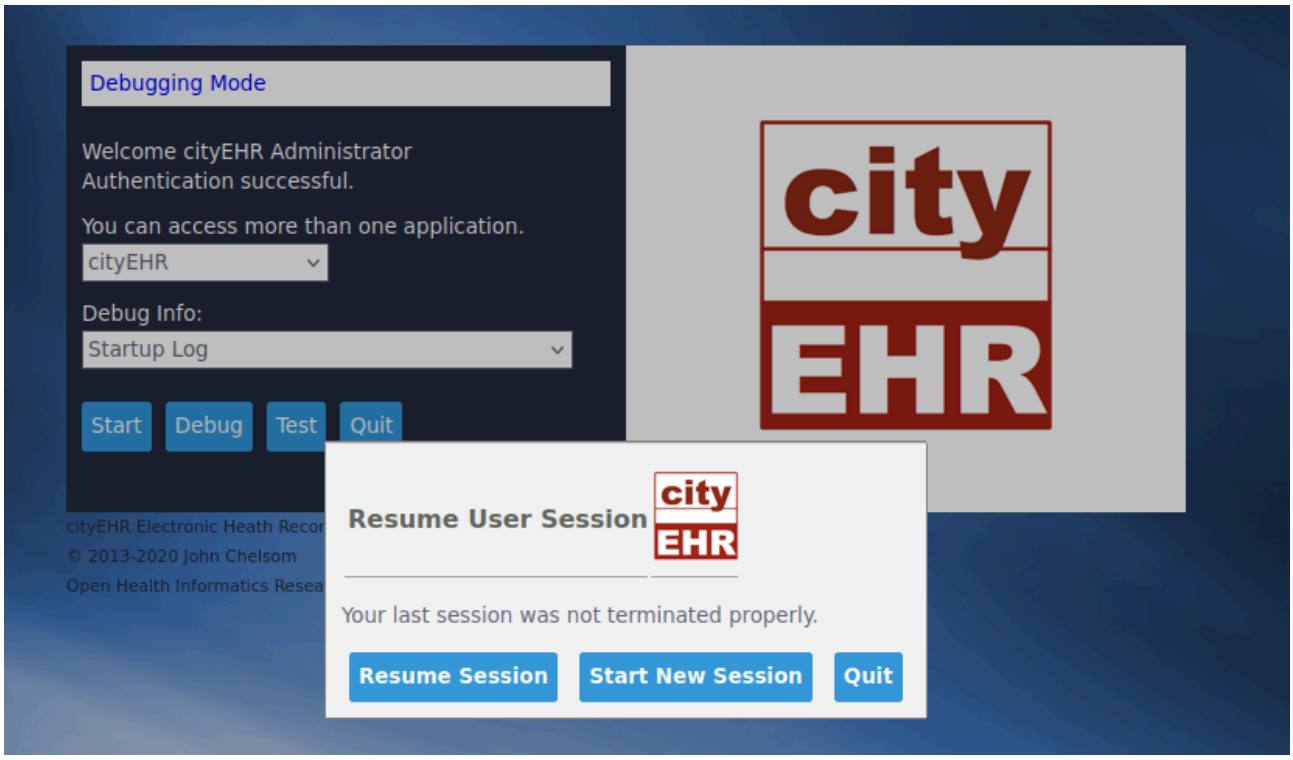
In addition, there is a session page load time limit which restricts the ability to refresh pages using the browser **reload current page** button. This limit is set by default at 10 minutes, but can be changed in the Admin page (System Parameters) if necessary. A change from the duration P10M (10 minutes) to PT1M (1 minute) is shown in the figure below.



Changing the Page Load Timeout on the Administration Page

If the browser reload page button is pressed within this time limit, then the page will reload as requested; outside the time limit the session will simply return to the sign on page. This means that it is not possible to copy and paste the URL of a cityEHR session or to bookmark a page (the URL will be invalid once the session page load time limit has expired).

Logging in after a session has expired (i.e. a session that was not Quit by the user) will prompt for the session to be resumed at the point the previous session timed out or was aborted.



Prompt to Resume Session on the Sign On Page

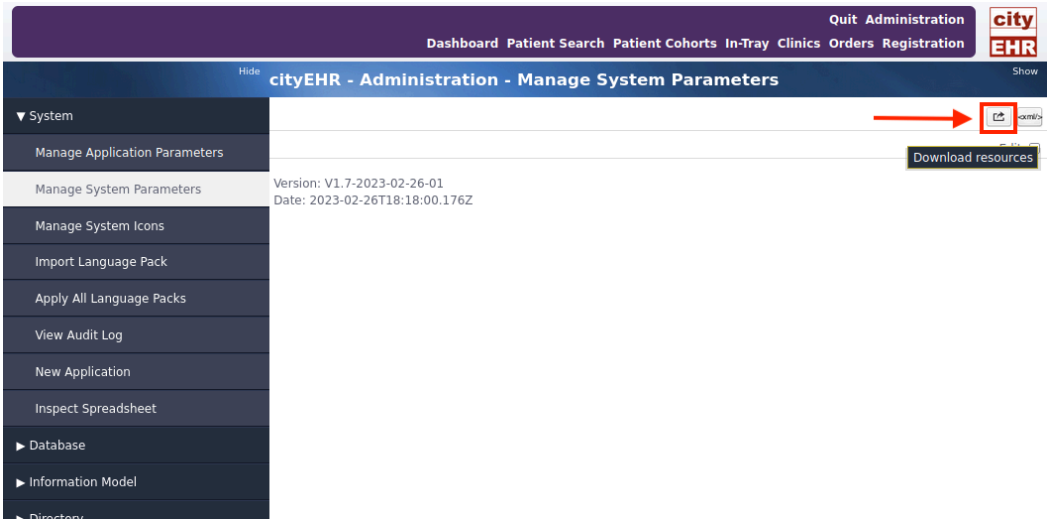
Download User Resources

Throughout this Quick Start Guide, some features will require resources such as sample patient records or information models. These resources are included with cityEHR and can be downloaded for your use.

You can access and download these resources from the Administration page. To do this:

1. Click the **Administration** button in the System Navigation menu (top right of the page) to open the Administration page.

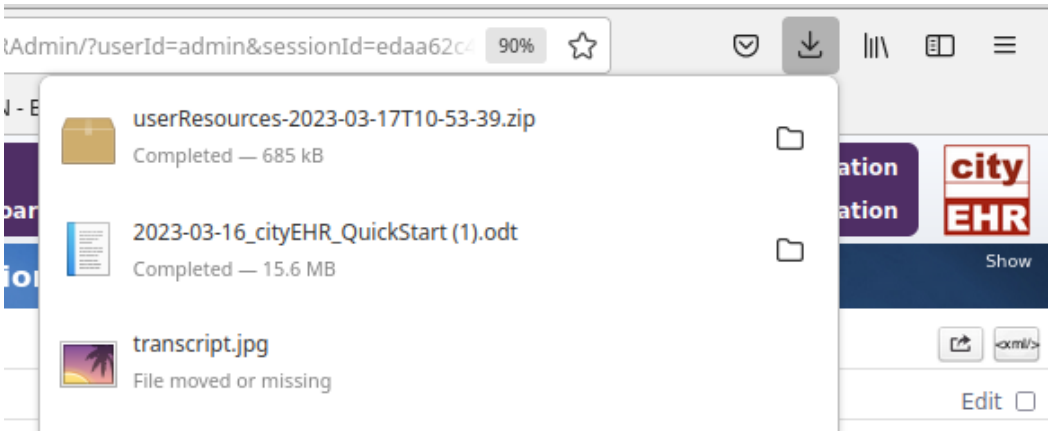
2. In the left-hand menu on the Administration page, select **Manage System Parameters** under the System menu.



Download User Resources from Administration Page

3. At the top right of this view, click the **Download Resources** button as shown in the figure below.

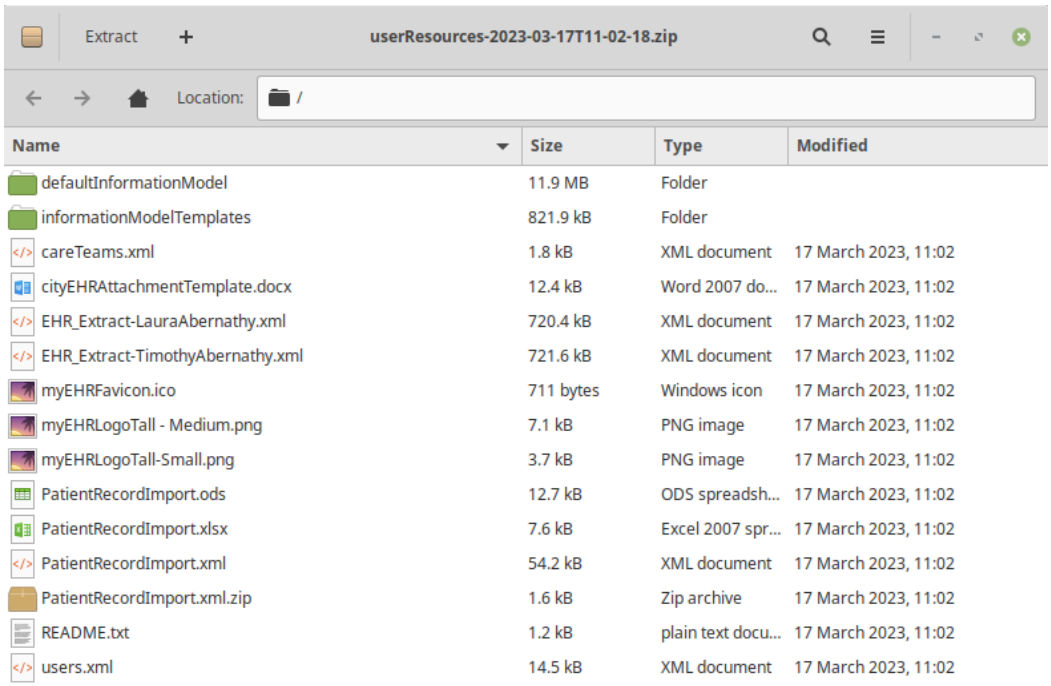
4. A zip file containing the resources will download to your browser. Depending on your browser setup, this file will be saved in your default Downloads folder.



Zip Archive of User Resources Downloaded to Browser

5. Open the zip file to access the folders and files included as User Resources. These resources will be needed at various points throughout the Quick Start Guide.

6. The complete set of resources should resemble the list shown in the figure below. (This example uses the Linux Archive Manager; your interface may vary depending on your system's zip file handling settings.)



Name	Size	Type	Modified
defaultInformationModel	11.9 MB	Folder	
informationModelTemplates	821.9 kB	Folder	
careTeams.xml	1.8 kB	XML document	17 March 2023, 11:02
cityEHRAttachmentTemplate.docx	12.4 kB	Word 2007 do...	17 March 2023, 11:02
EHR_Extract-LauraAbernathy.xml	720.4 kB	XML document	17 March 2023, 11:02
EHR_Extract-TimothyAbernathy.xml	721.6 kB	XML document	17 March 2023, 11:02
myEHRFavicon.ico	711 bytes	Windows icon	17 March 2023, 11:02
myEHRLogoTall - Medium.png	7.1 kB	PNG image	17 March 2023, 11:02
myEHRLogoTall-Small.png	3.7 kB	PNG image	17 March 2023, 11:02
PatientRecordImport.ods	12.7 kB	ODS spreadsh...	17 March 2023, 11:02
PatientRecordImport.xlsx	7.6 kB	Excel 2007 spr...	17 March 2023, 11:02
PatientRecordImport.xml	54.2 kB	XML document	17 March 2023, 11:02
PatientRecordImport.xml.zip	1.6 kB	Zip archive	17 March 2023, 11:02
README.txt	1.2 kB	plain text docu...	17 March 2023, 11:02
users.xml	14.5 kB	XML document	17 March 2023, 11:02

User Resources Zip Archive

Exploring the Default cityEHR Application

This topic introduces the process of registering a new patient in the cityEHR application, guiding users through each step required to create a patient record. It explains how to access the registration form, complete required fields, and leverage features such as the demographics lookup service for auto-filling patient details. Additionally, the chapter covers options for entering GP details and addresses potential error messages. By the end, users will understand how to finalize patient registration and then search for them.

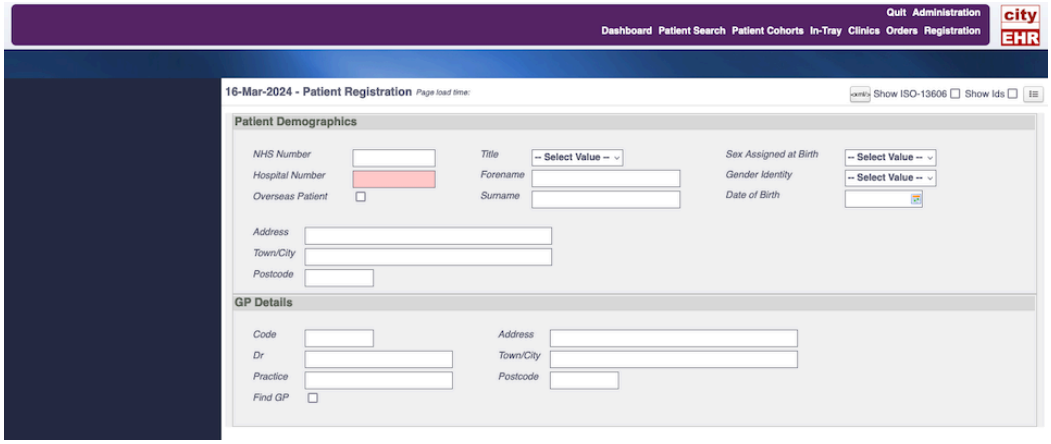
Registering a New Patient

On install, the database for the cityEHR application does not contain any patient records. To start using cityEHR, the first step is to create patient records via the patient registration page.

1. Log in using the default credentials:

    - **Username:** admin
    - **Password:** password

2. Click the **Registration** button in the System Navigation pane to access the registration form.

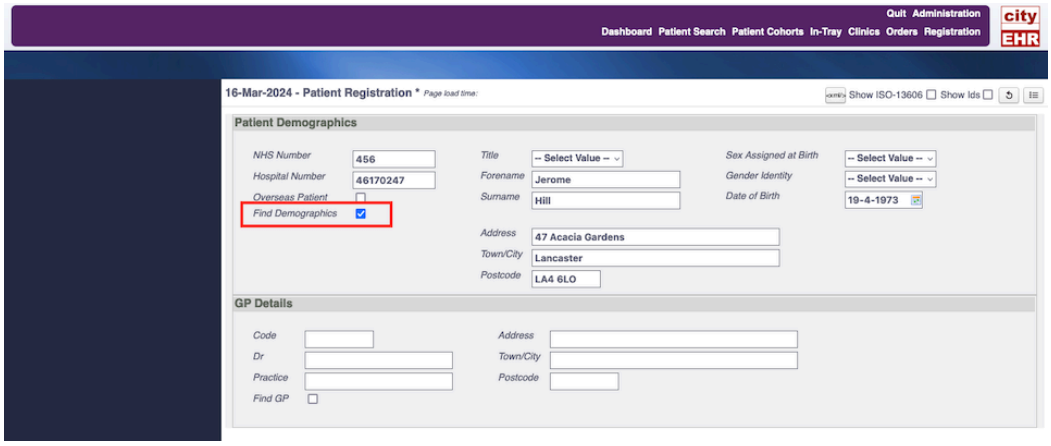


Patient Registration Form

3. Enter a **Hospital Number**, which is a mandatory field (highlighted in pink) and serves as the unique patient identifier. All other fields are optional.

4. Fill in patient details (e.g., NHS Number, Title, Forename) manually or use the **Find Demographics** service:

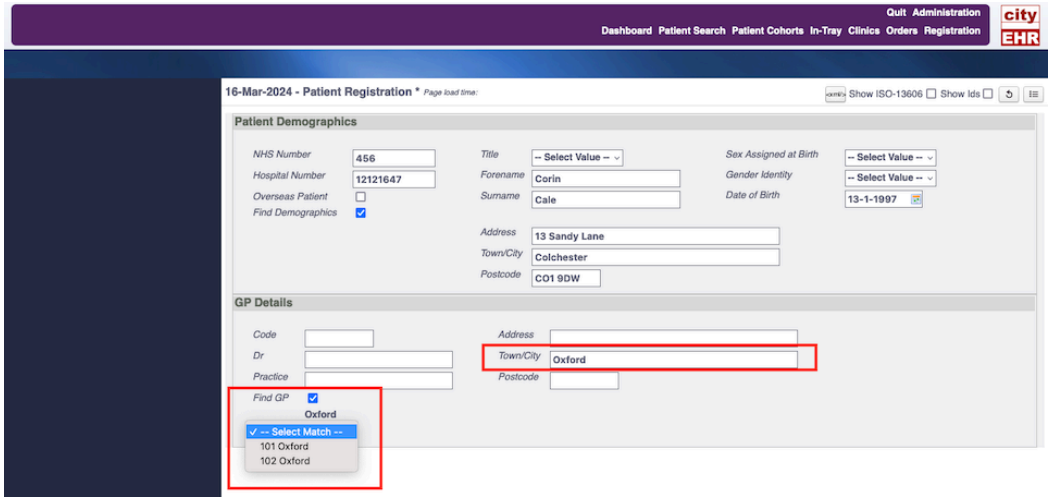
    - Enter the NHS Number (simulating a national patient identifier).
    - Check the **Find Demographics** checkbox, which appears after entering the NHS Number.
    - The demographics service populates remaining fields with simulated data or, in live systems, pulls data from EPR or national services.



Patient Registration “Find Demographics” Lookup Service

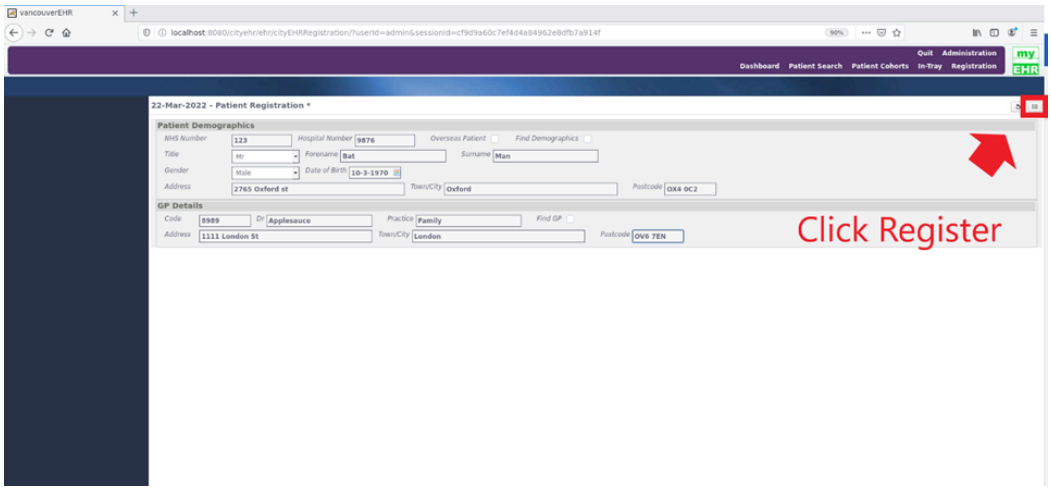
5. Similarily, Fill in GP details manually or use the **Find GP** service:

- Enter *Oxford* in the Town/City field.
- Check the **Find GP** checkbox to display two options. Select one to auto-fill GP details.



Find GP Service

6. Once all the details are entered (either by typing in the fields or by using the lookup services). Click the **Register** button (hover over it to see the label).

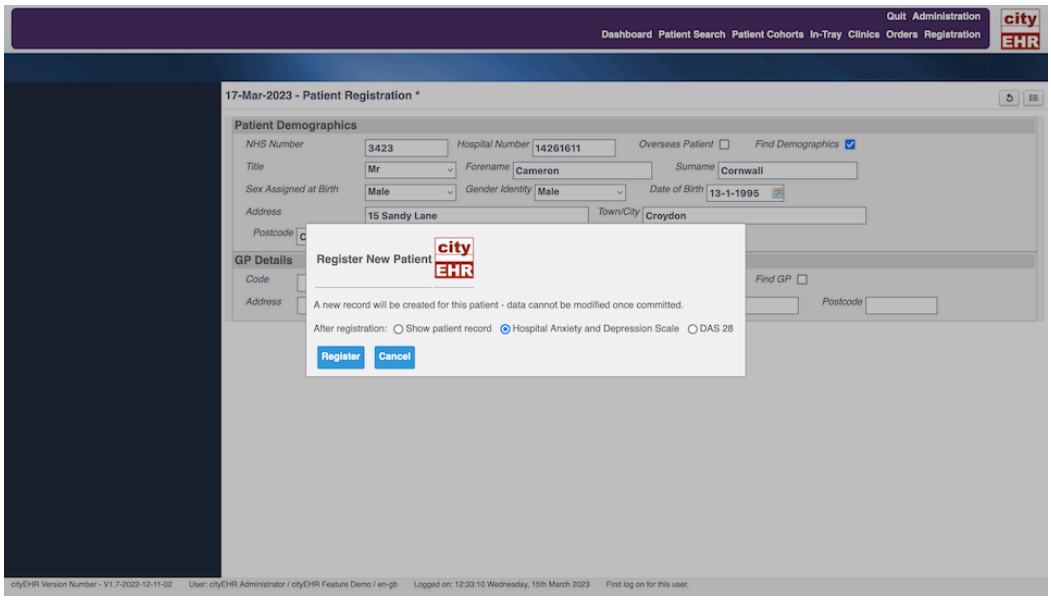


Register Button

7. If successful, confirm the action in the dialogue box and choose the next navigation step (default: *Hospital Anxiety and Depression Scale form*).

8. If the Hospital Number is missing or already exists, an error message will appear. Dismiss it, update the field, and try again.

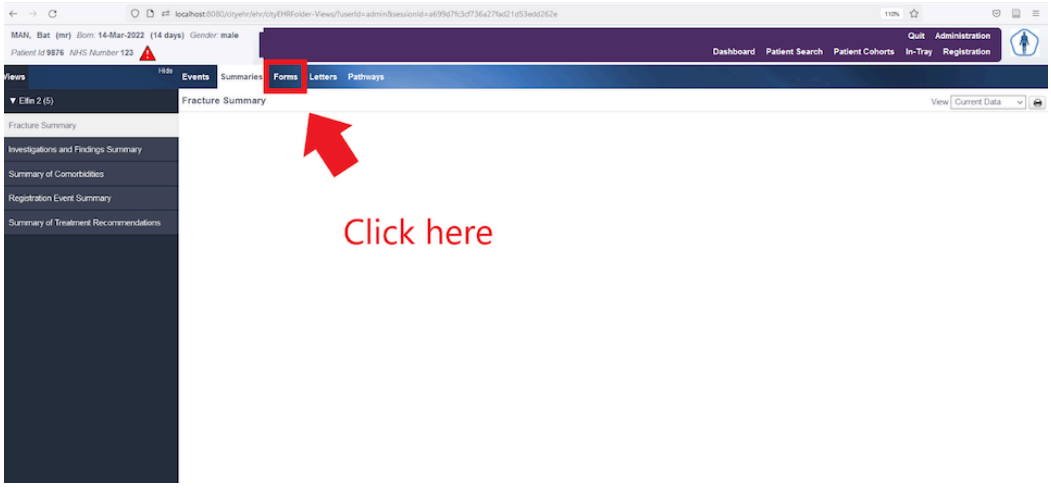
9. Once registered, a confirmation message is displayed, completing the patient registration process.



Confirmation of Patient Registration

Entering Patient Data

1. After registration, navigate to the **Forms** tab to access patient data entry forms. If the page does not load automatically, click the **Forms** tab.



Locating Forms Page

2. You will be presented with a list of new forms that can be entered for this patient. The forms are listed in various 'contexts of care' with the top category 'cityEHR Feature Demo' containing all the forms available and the others containing smaller sets of forms for Administration and for Clinical Care.

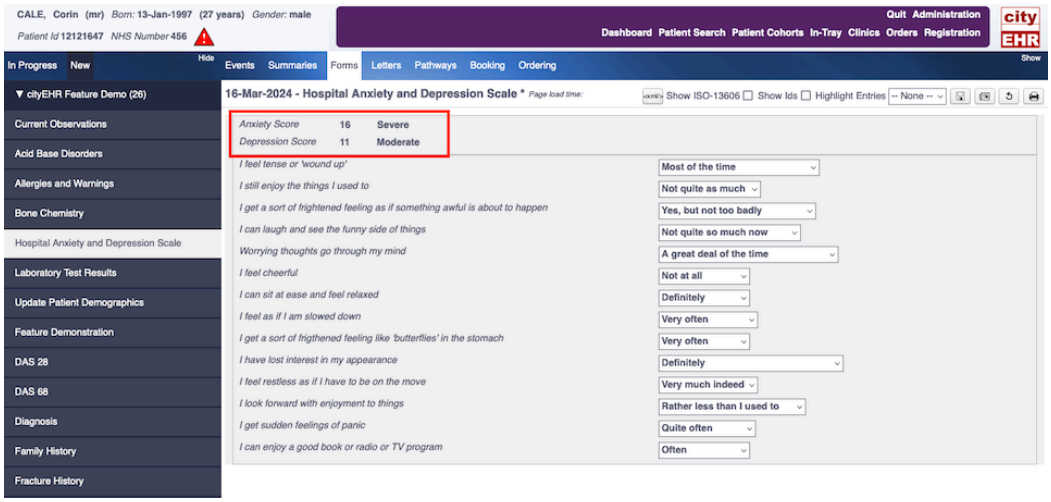
Form with Enumerated Values and Calculated Data

1. Forms can now be selected to enter new patient data. For this example the **Hospital Anxiety and Depression Scale (HADS)** will be used. Select the Form from the left navigation menu.

Hospital Anxiety and Depression Scale Form

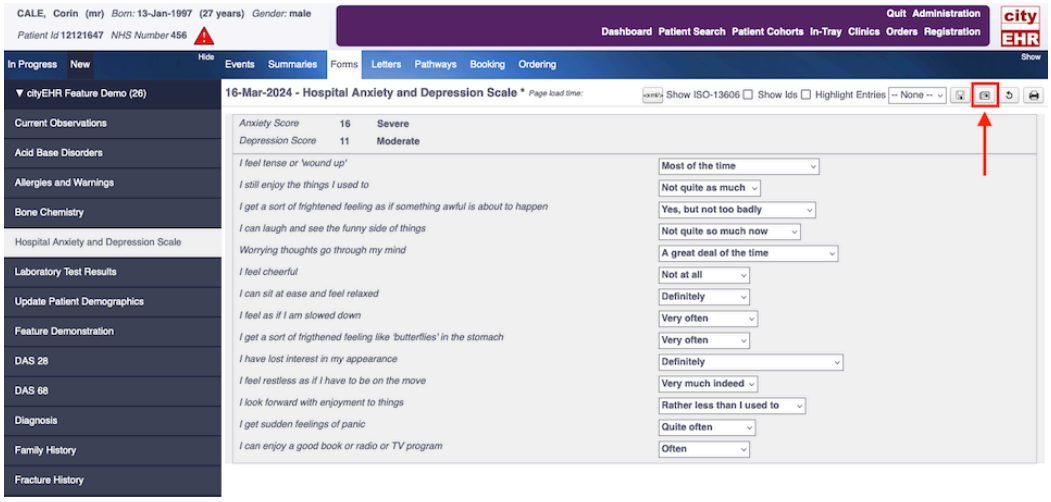
2. The form will load and you can now enter data into the fields by answering each question using the drop down menu selections. For this test, it doesn't really matter how you answer the questions – ensure you continue to the bottom of the page and select an answer for every question.

3. At the top of the HADS form are two calculated entries for Anxiety Score and Depression Score. These will be calculated when all the questions have been answered.



HADS Form: Anxiety and Depression Scores

4. Once you have finished entering data you can **Publish** the form to the patient record by clicking Publish in the EHR view controls.



Publishing Completed HADS Form to the Patient Record

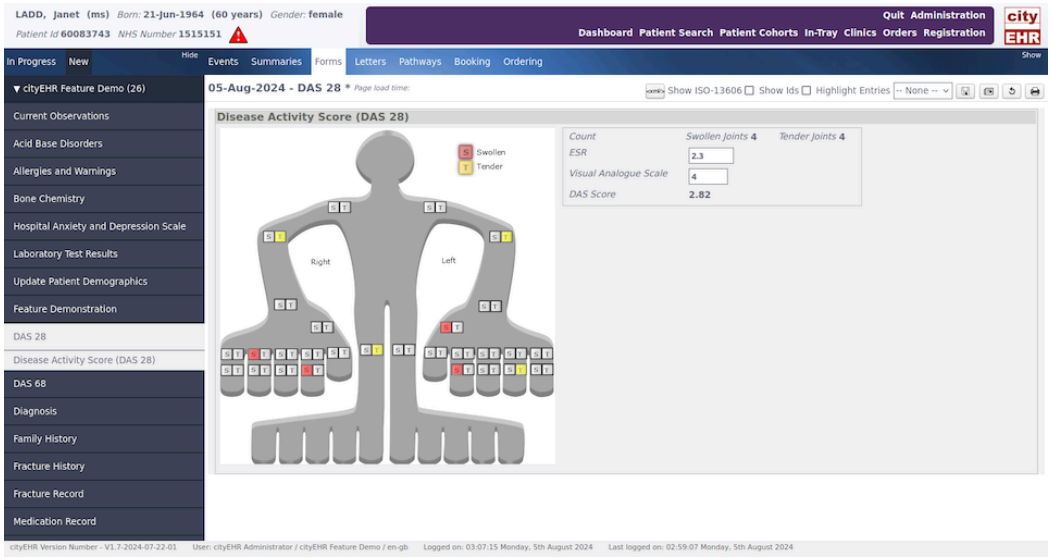
5. Select the **Commit Form** button with the radio button **Show patient record** selected.

6. Once the data have been committed to the patient record you will be moved back to the patient record folder displaying a list of all data in the record for your patient, including the HADS data just completed.

Patient Record Folder with Completed Hospital Anxiety and Depression Scale Form

Form with Graphical Data Input

1. Return to the **Forms** tab and select the form for **DAS 28.** This form records the Disease Activity Score for the patient, by selecting joints that are either tender or swollen. The input of tender or swollen joints is made by clicking on the appropriate area in the homunculus image.



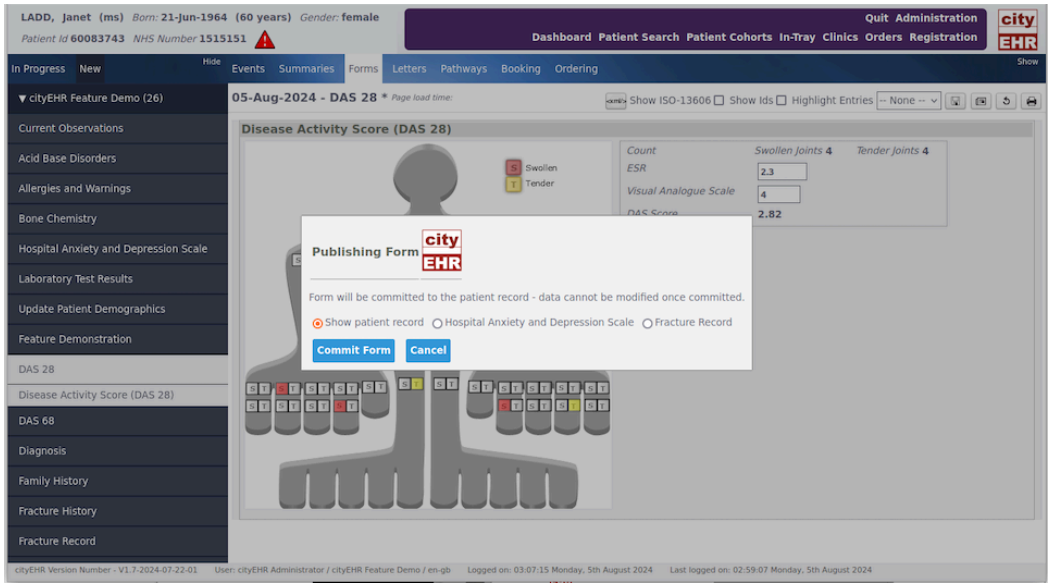
Disease Activity Score (DAS) 28 Form

2. As you click to select the tender and swollen joints you will see the counts changing. Enter values for ESR (e.g. 2.3) and Visual Analogue Score (e.g. 4) and the DAS Score will calculate.

3. The DAS Score will be recalculated each time you select a tender or swollen joint or change either the ESR or Visual Analogue Score.

4. Once you have finished entering data you can **Publish** the form to the patient record by clicking the Publish button as before. Confirm the action and the DAS 28 data stored in the patient record.

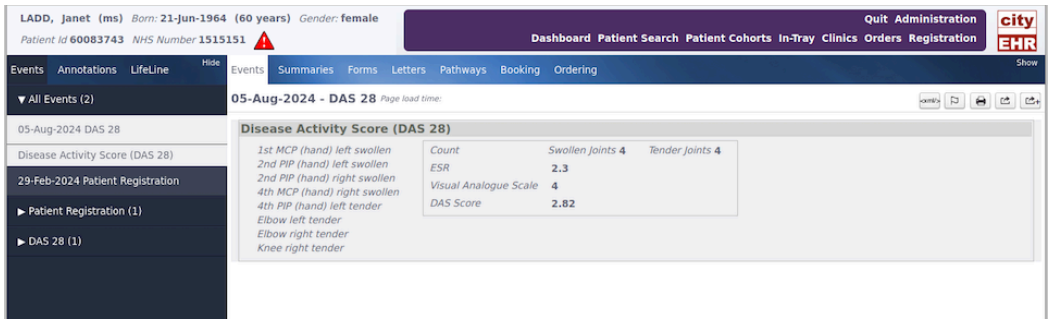
5. Select **Commit Form** on the Dialogue Box that appears after clicking Publish.



Committing Completed Disease Activity Score (DAS) 28 Form

6. The patient record now displays the event, with the data you recorded.

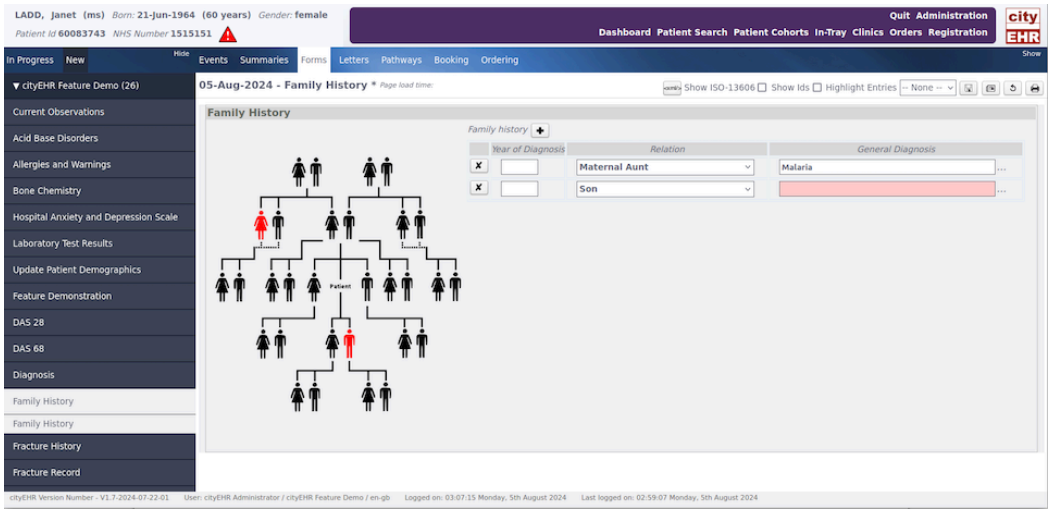
   Note: This does not include the homunculus graphics that was used for data entry.



Event Displayed in the Patient Record

7. Return to the **Forms** tab and select the **Family History** form from the left navigation menu.

   Note: You may need to reduce the resolution of the page to fit the display of the form shown below, or you can press the small Hide button to collapse the left hand navigation pane and give more room for the form.



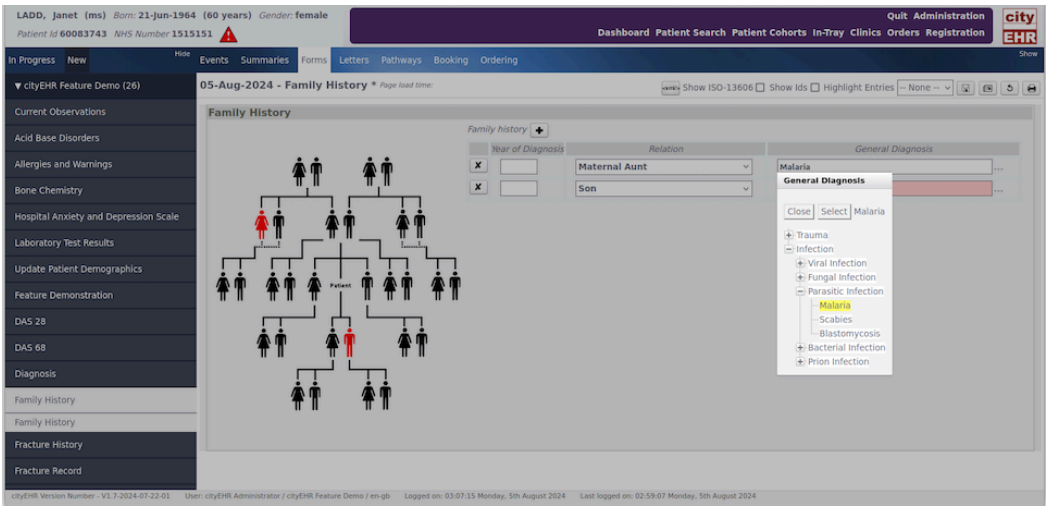
Family History Form

8. This form has a representation of the family tree for the patient. Click on people icons in the image to select a family member – this will then add a new line to the list of family members where you can fill out the date and details of a general diagnosis for that person.

9. To enter the diagnosis you can either press the **'...'** button to the right of the empty field, or begin typing for an auto-complete of the diagnosis.

10. You can also add family members by clicking the small **'+'** button at the top of the family history list, or remove a family member by pressing the **'x'** button next to the family member.

11. Once again, publish the form to the patient record when you are done.

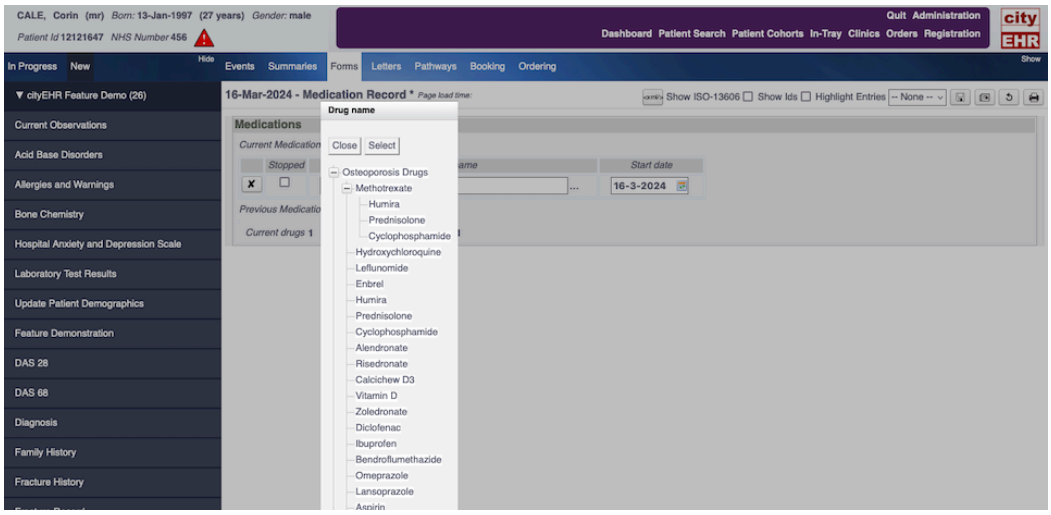


Selecting the Diagnosis from a Drop-down

Form with Sorting of Entries and Conditional Elements

1. Within the **Medication Record** Form, you can enter data for either Current Medications or Previous Medications by pressing the appropriate **'+'** button.

2. To enter the name of the medication you can either start typing in the input box, or select **'...'** to the right ofthe empty field, which will bring up an expandable list of medications from which you can select.

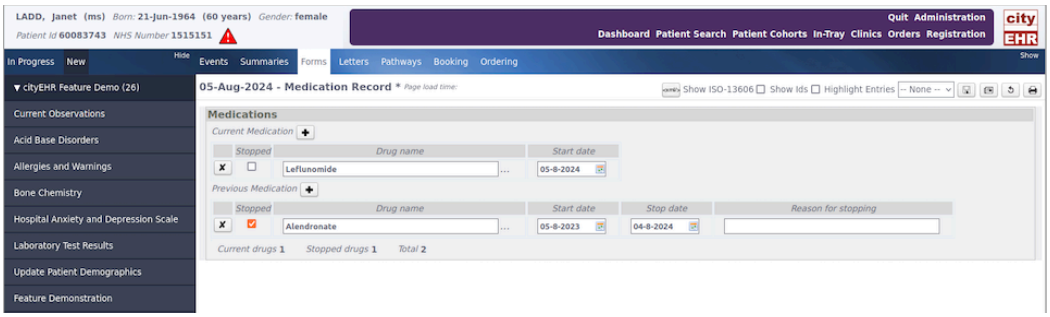


Medication Form's Expandable List of Medications

3. When typing the name of the medication you will either get a single medication filled out automatically as soon as your input matches it uniquely, or a drop-down selection of matching medications.

4. Once you've added a collection of medications, try checking or unchecking the **Stopped** button. When you do this, the medication will be moved between the lists for Current or Previous Medications.

5. Publish the form to the patient record when you are done.

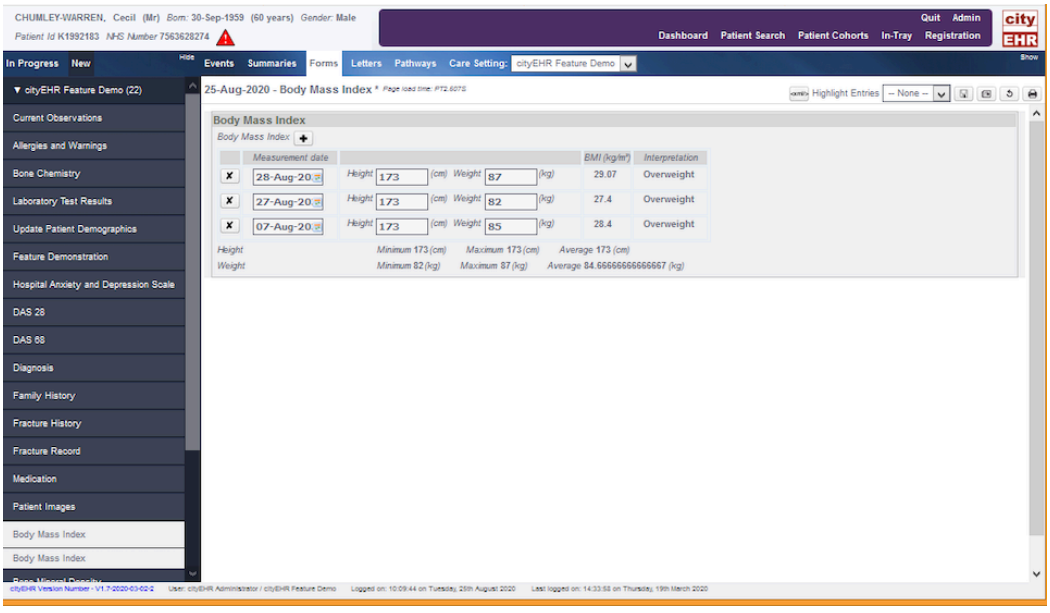


Categorization of Current and Stopped Medications

Form with Multiple Entries, Calculations and Pre-Filled Data

1. Navigate to the **Body Mass Index** Form.
2. On this form you can enter a set of measurements for height and weight of the patient on various dates – the Body Mass Index (BMI) will be calculated, along with the average height and weight for the patient.
3. Publish the form.
4. Now return to the **Forms** tab and select the **Body Mass Index** form again.
5. The form will be pre-filled with the entries added in the previous step.
6. New entries can be added, however published ones cannot be removed or edited.

   Note: The information model defining this behaviour can be set up to allow previous entries to be updated and/or deleted.



Body Mass Index Form with Calculations

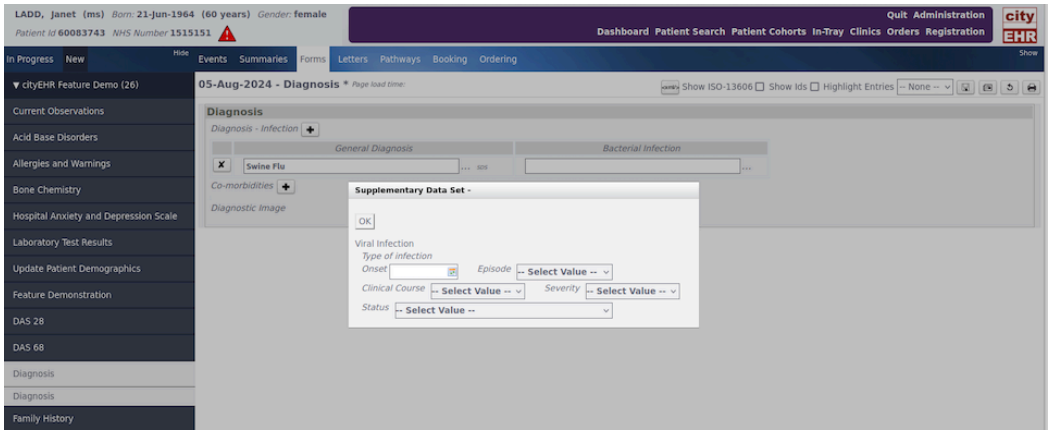
Form with Enumerated Class and Supplementary Data

1. Navigate to the **Diagnosis** Form.
2. Press the **'+'** button to add a new diagnosis.

3. Select **'...'** to browse avaliable diagnoses or use the auto-complete (e.g. type sw...)

4. Depending on the diagnosis you select, you may see an additional **SDS** to the right of the diagnosis once it is selected.

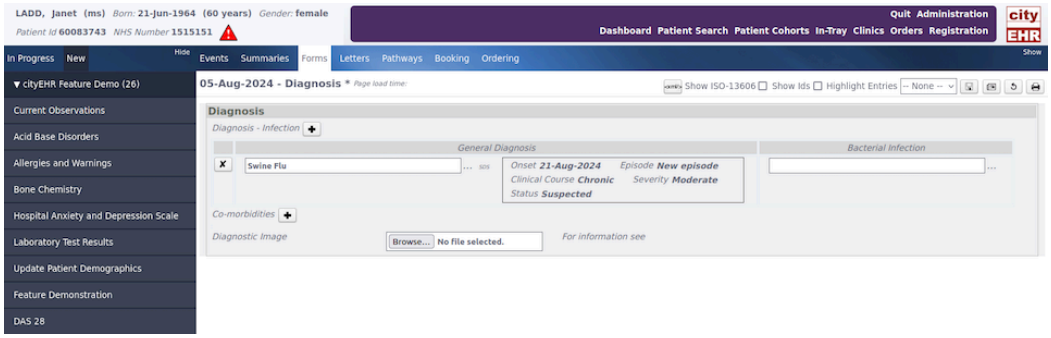
5. Select this button to see the Supplementation Data Set dialogue.



Entering a Supplementary Data Set

6. Complete the required data for the dialogue box and select **OK** when completed.

   The supplementary data is displayed next to the diagnosis it is associated with.



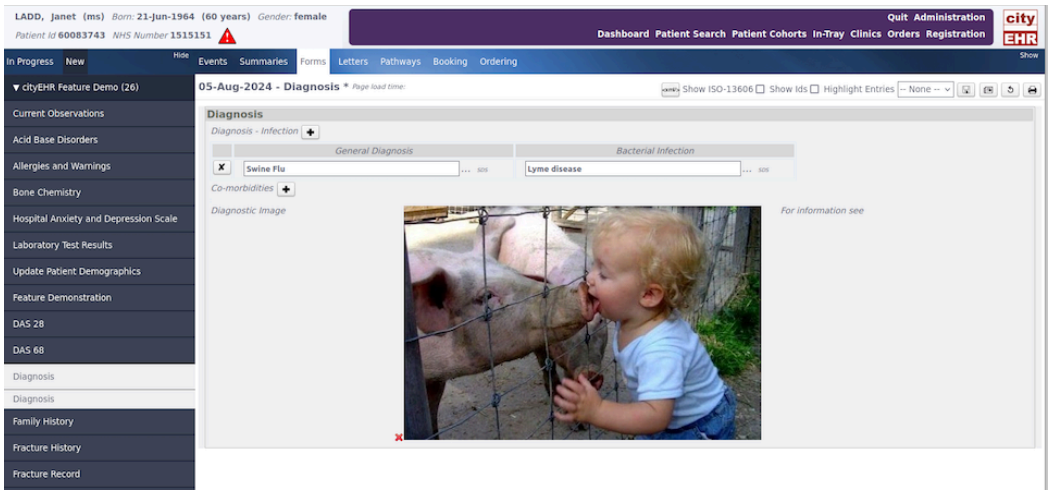
Display of Supplementary Data Set

7. Now add a diagnostics image by selecting the **Browse** button from Diagnostic Image.

8. Navigate to a file on the file system to upload that image to the record.

   Note: The image is stored directly in the current composition when it is committed to the patient record – this feature is designed for informal images as the type that might be capture in a mobile phone, not full diagnostic images capture using some imaging modality – any such images would be managed in the PACS, not the EHR.

9. Once the image has been uploaded it is displayed inline on the form.



Diagnostic Image Uploaded from the File system

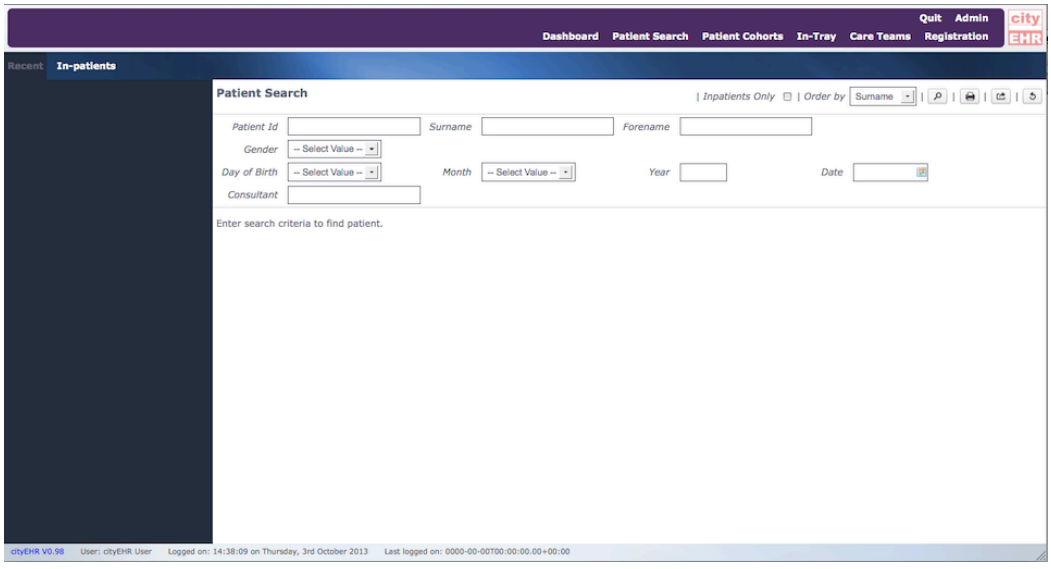
10. Select the **Publish** to commit the form to the record and navigate to the patient **Events.**

11. The data recorded in now saved and displayed in the patient record, including the uploaded image.

Finding Patients

Once patients are recorded in your database, you can search for them and select the desired patient to view their record or input data.

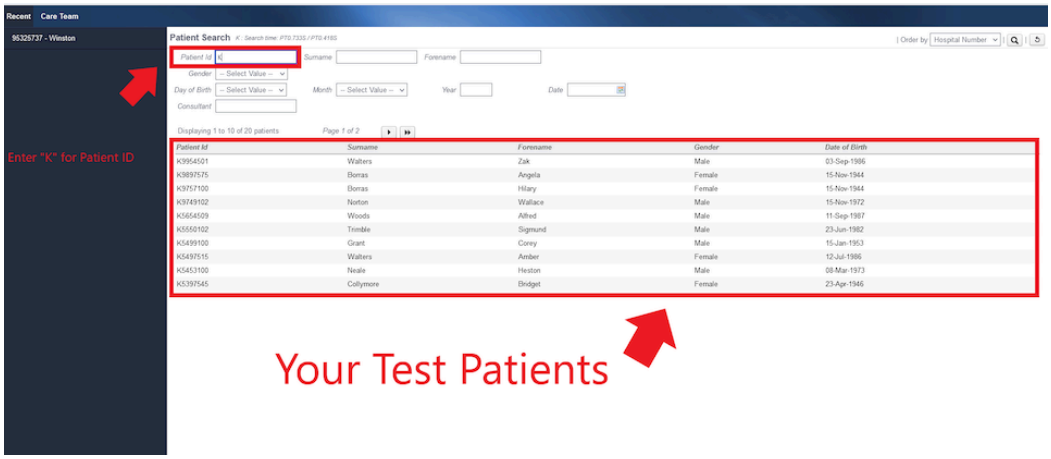
1. Click the **Patient Search** button in the purple system navigation pane at the top of the page to open the search form, as shown below.



Patient Search Form

2. Enter your search criteria and click the **Search** button at the top of the form. You can also press **Enter** after typing in any text input field. Hovering your mouse over the button will display its name.

3. For test patient data, try searching using a common letter in the surname or a patient identifier. For example, entering "K" may return results if the default format for patient identifiers was used when generating the test data.

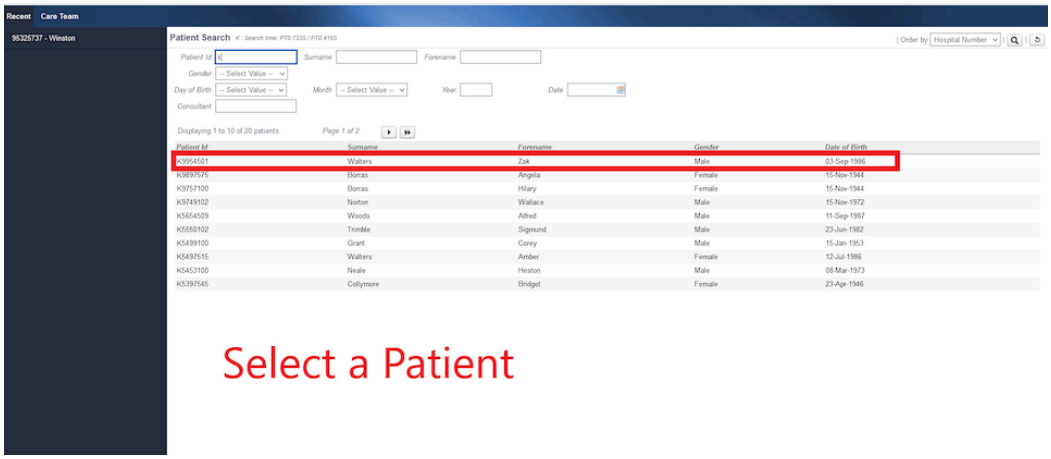


Searching Patients with Patient ID using “K” as a Patient Identifier

4. The search results will display basic demographic details of matching patients:

   - If no results are found, a notification will appear.
   - If too many patients match your criteria (e.g., searching for "Male"), you’ll be prompted to enter more specific search criteria.

5. When patients are found, the list will display even if only one result matches. This allows you to confirm the correct patient before viewing their record.



List of Patients Found Using Patient Search

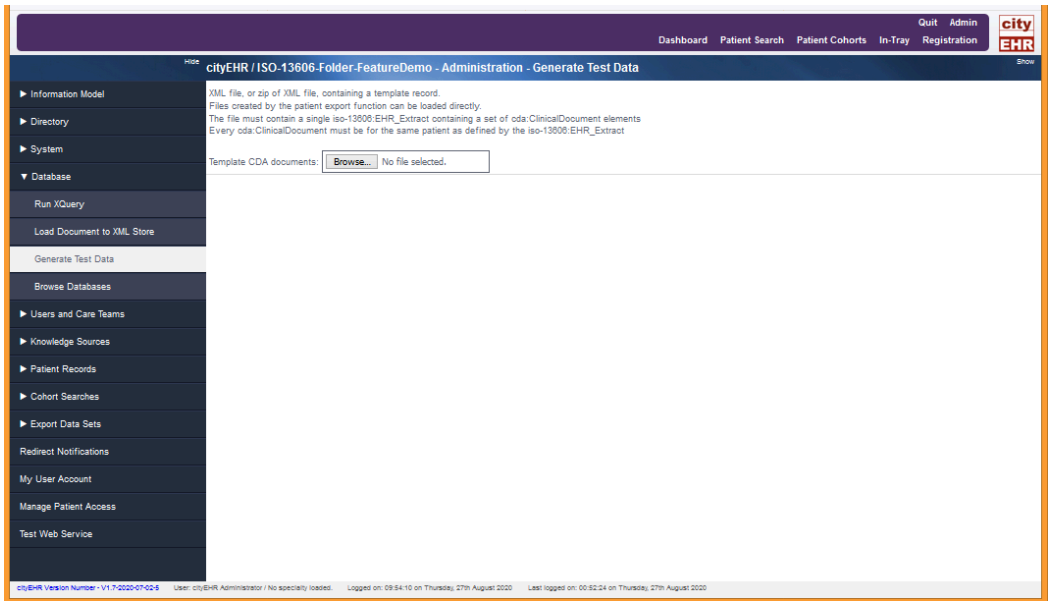
6. Click a patient from the list to access their default summary view. This view includes features for reviewing, charting, and annotating the record. The next exercise will guide you through these functionalities.

Creating Test Patients

To explore cityEHR further, you will need a larger sample of test patients. These can be generated using the functions available on the **Administration** page, which is accessed by clicking the **Administration** button in the main system menu (top right of the page).

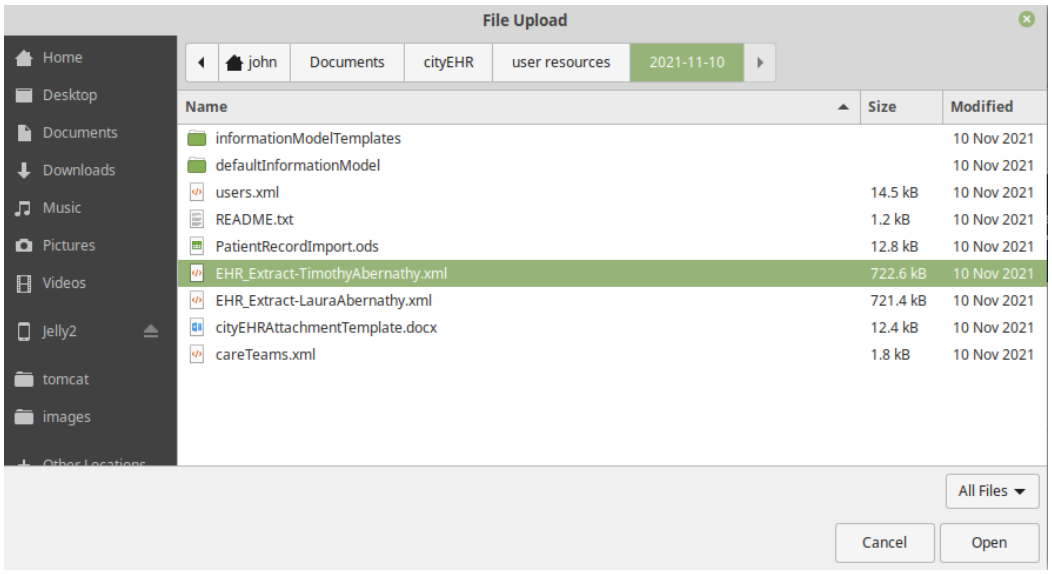
1. On the **Administration** page, select the **Database** option from the left-hand menu, and then click **Generate Test Data**.

2. Click the **Browse** button to load a file containing a sample patient record.



Generating Test Data

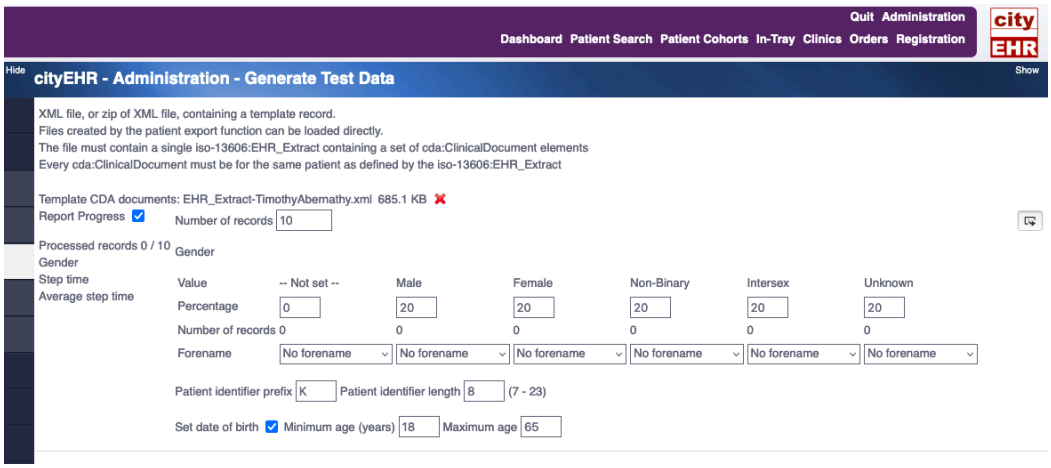
3. Navigate to your downloaded **User Resources** folder and select the file named *EHR_Extract-TimothyAbernathy.xml*. (You can open this file separately using a text editor if you wish to view its contents.)



Locating “EHR_Extract-TimothyAbernathy.xml” in User Resources Folder

4. The **User Resources** folder was created when you downloaded resources in the *verifying the Installation* section.

5. After uploading the *EHR_Extract-TimothyAbernathy.xml* file, you will see a range of options for generating test data, as shown below:



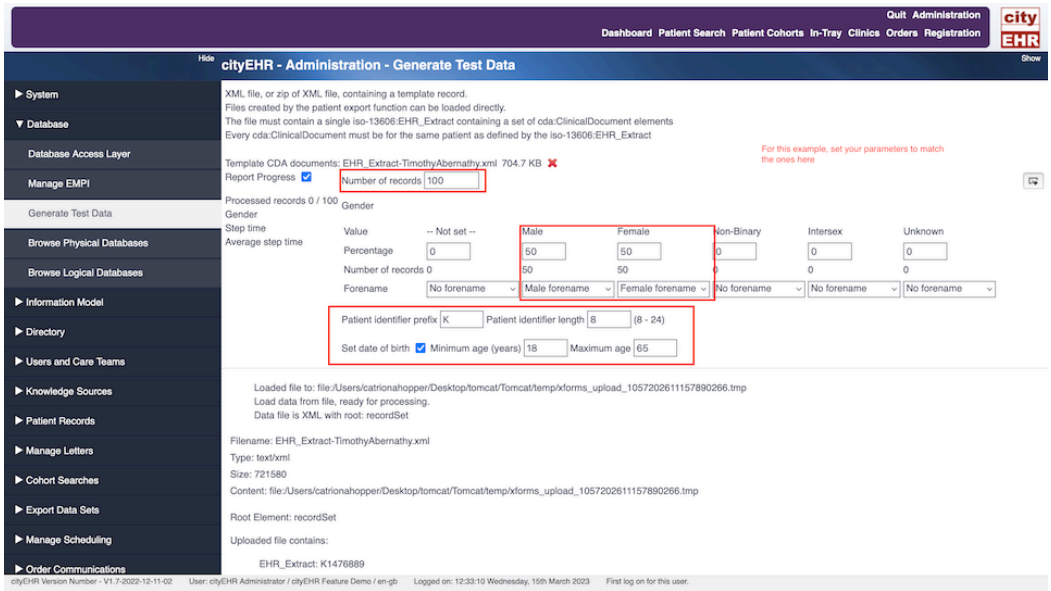
Generate Test Data Parameters, Following File Upload

6. By default, the system generates 10 test records evenly split between male, female, and other gender categories, aged between 18 and 65.

7. To customize, adjust the percentages in the gender columns (e.g., set **Male** and **Female** to 50% each and the others to 0%). Ensure the percentages total 100%; otherwise, an error message will appear. Optionally, generate 100 records instead of 10, but note that it may take up to 5 seconds per record, potentially exceeding 5 minutes for 100 records.

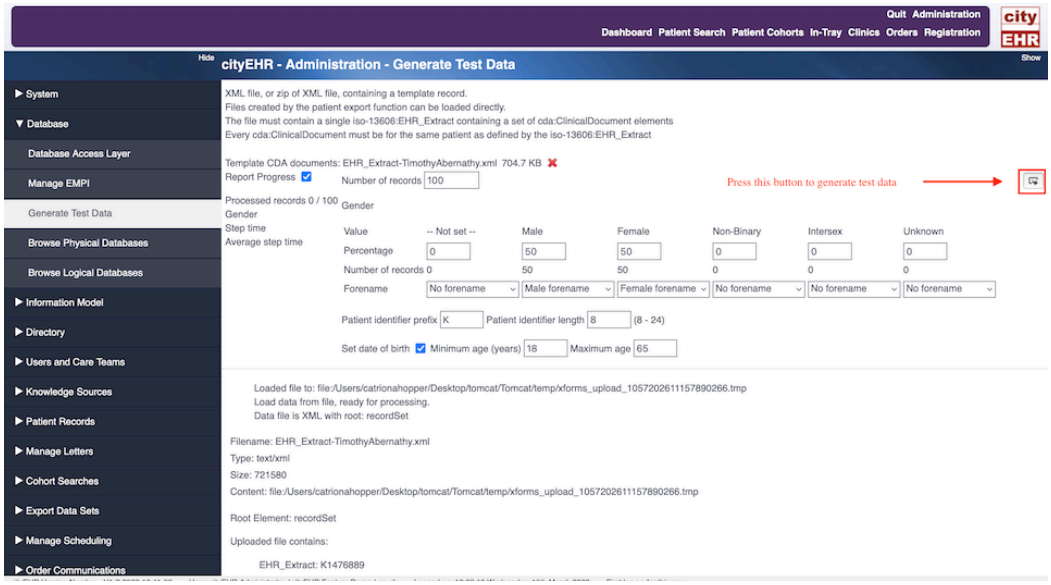
   Note: The Generate button will only be active when the percentages across all categories add up to 100%

8. Set the **Forename** selection to **Male Forename** and **Female Forename** in their respective columns.



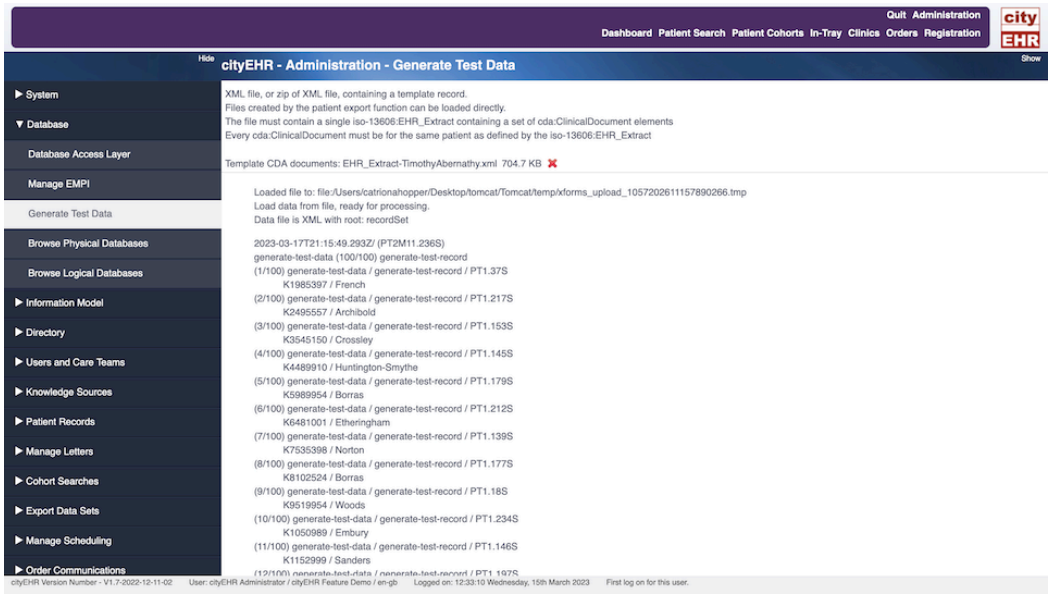
Generate Test Data with Parameters Set

9. Once the parameters are configured, click the small **Generate** button on the right-hand side to create the test records. This process may take some time to complete.



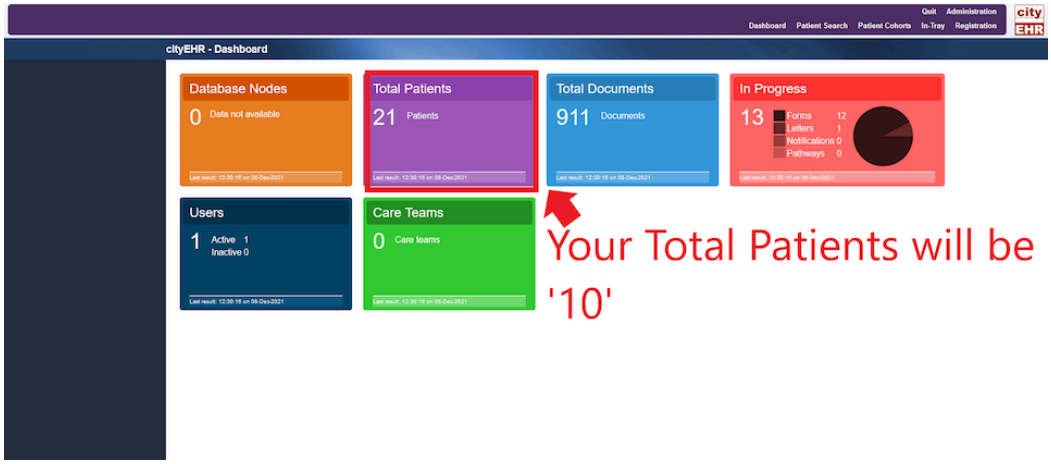
Generating Test Data

10. After the records are generated, your screen will display a confirmation, as shown below:



Generating Test Data Completed

11. Click the **Dashboard** button in the main system menu to leave the **Administration** page. The **Dashboard** will now reflect the newly loaded records.



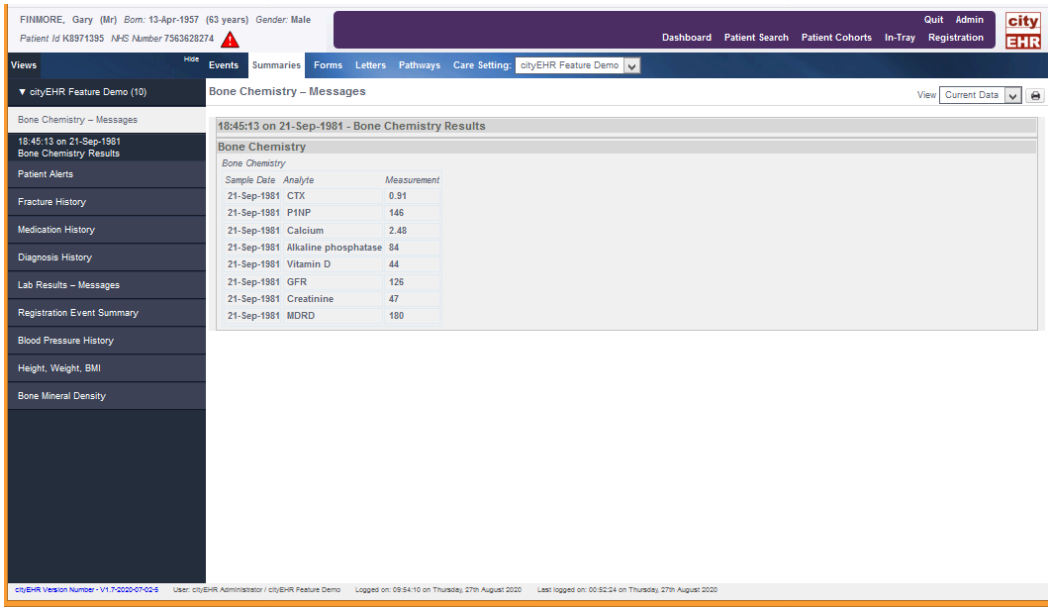
Updated Dashboard with Generated Test Data

Viewing the Patient Record

Summary View and Charting

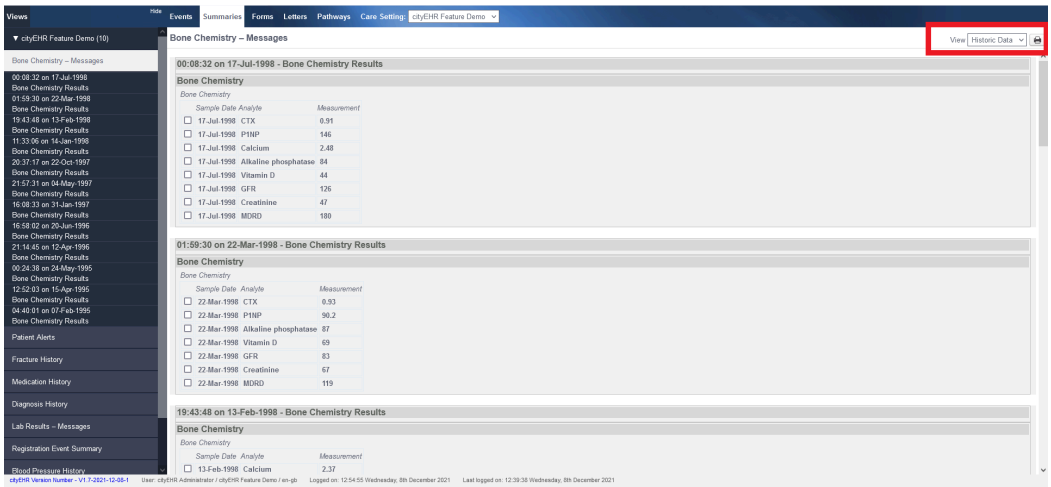
When you first access a patient's record, the **Summary** page is displayed, providing a selection of various summary views.

1. The default view is the summary for **Bone Chemistry – Messages**. These are bone chemistry results that have been sent to the cityEHR as messages from the laboratory which performed the tests. (At least we are pretending this in the test data, although the results used were originally generated in this way)



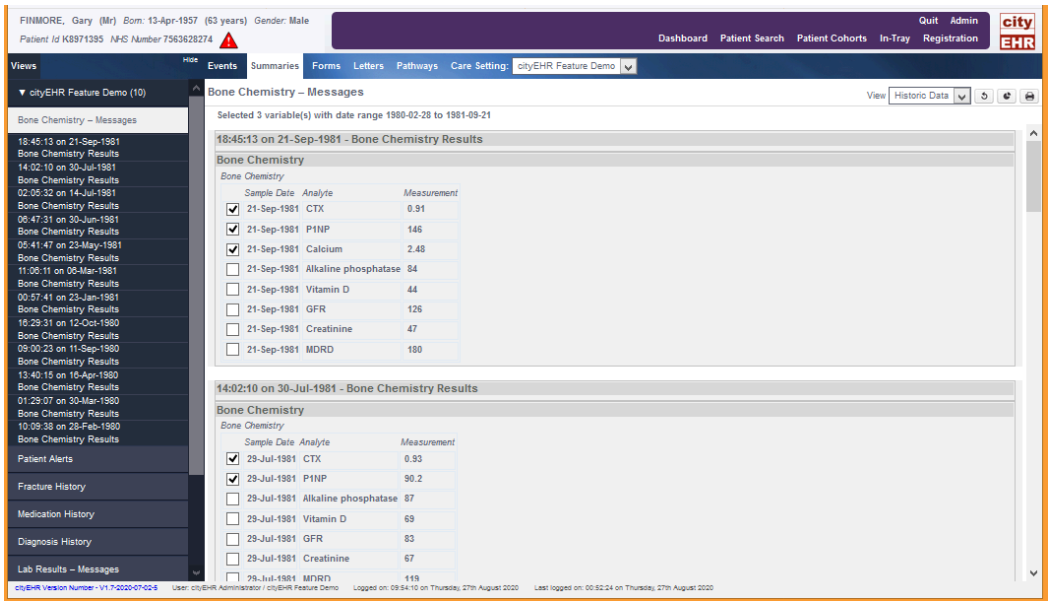
Summary View for Bone Chemistry – Messages

2. By default, only the most recent set of bone chemistry results is shown. Use the drop-down menu at the top-right of the pane to select **Historic Data**, displaying the complete history of results for the patient.



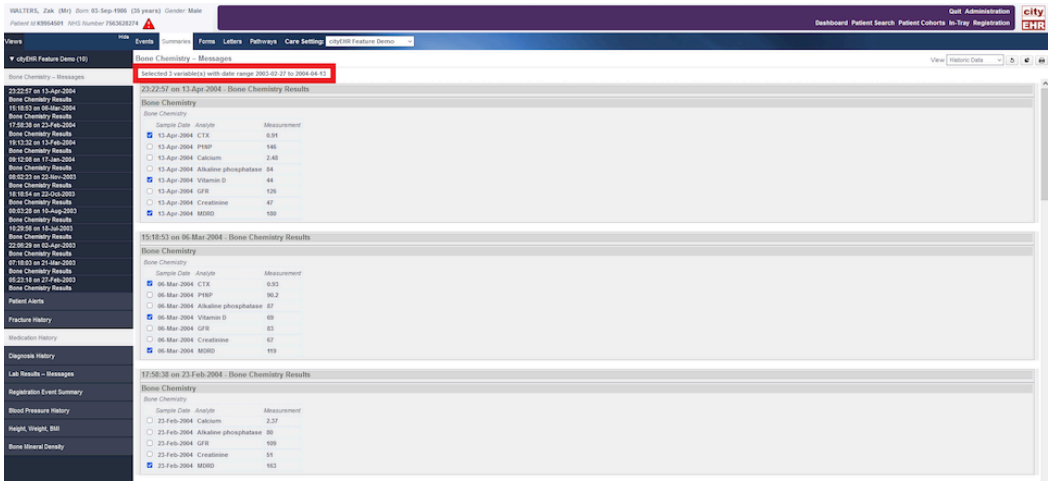
Changing Summary View to “Historic Data”

3. Select two or three analytes (e.g., CTX, P1NP, Calcium) to view on a chart by checking the corresponding boxes. Selecting a box in one result set will also select it across other sets.



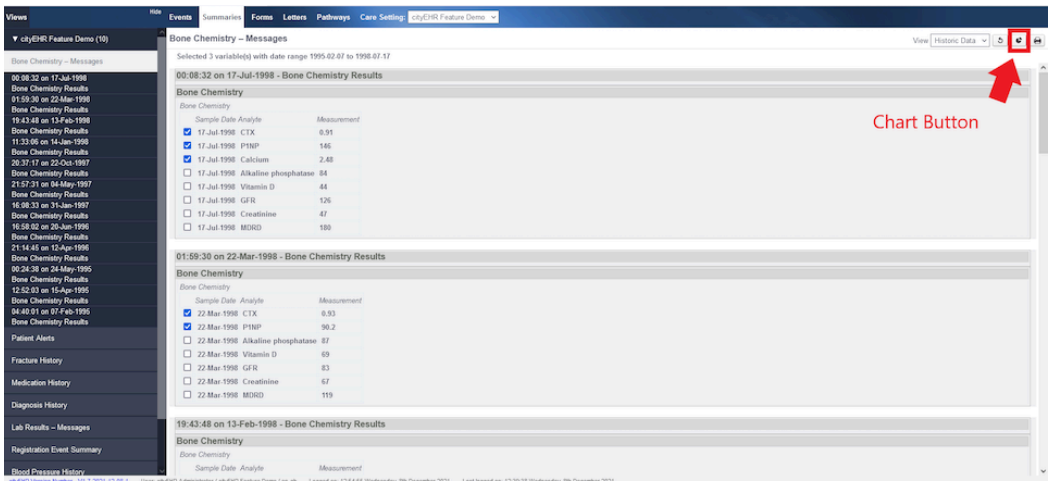
Selecting Analytes to View on Patient Chart

4. As analytes are selected, a summary of the total number and the data range is updated at the top of the pane.



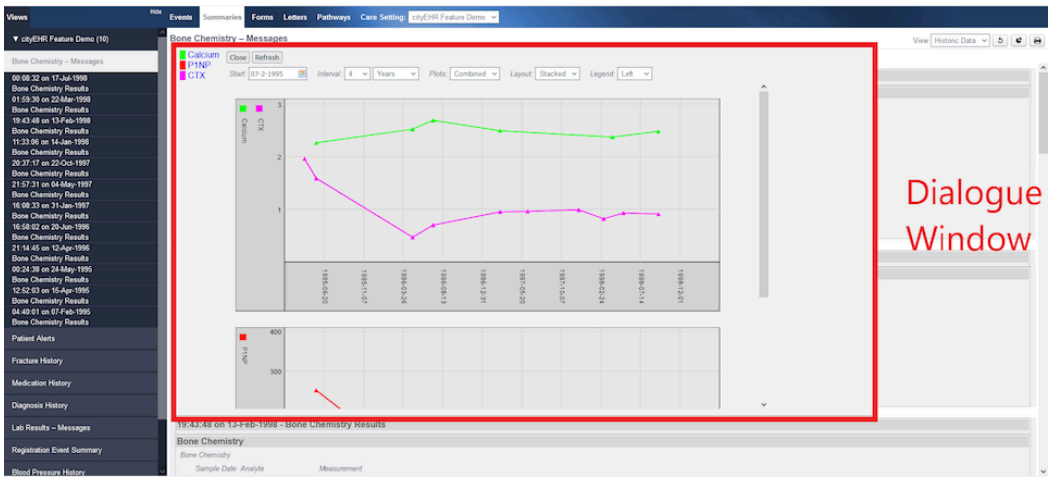
Summary of Analytes Selected and Overall Data Range Covered

5. Select the **Chart** button, now visible at the top-right of the pane, to generate a chart for the selected analytes.



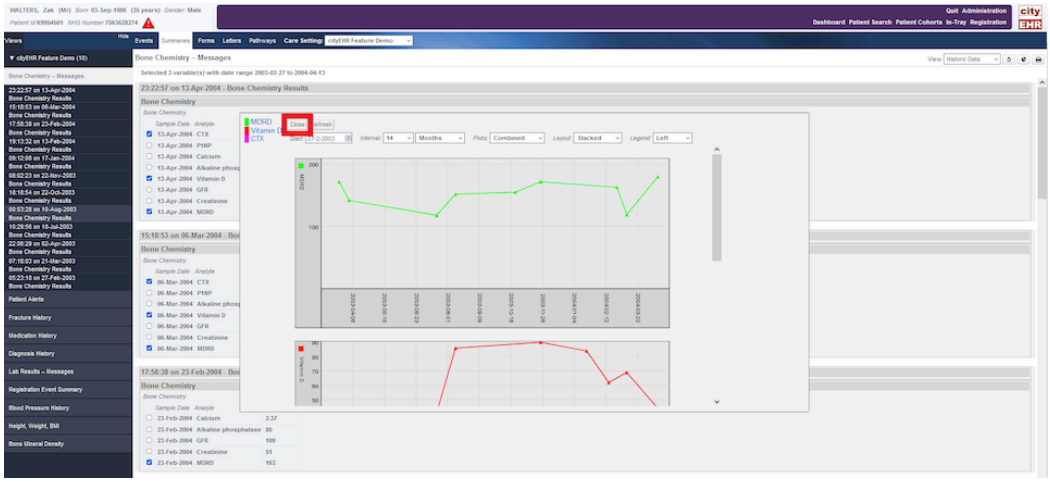
Using Chart Button to Commit Analytes for Chart View

6. On pressing the Chart button, a dialogue window will appear showing the charts for the selected analytes. Adjust the chart parameters using the options at the top of the dialogue.



Dialogue Window with Charts of the Analytes Selected

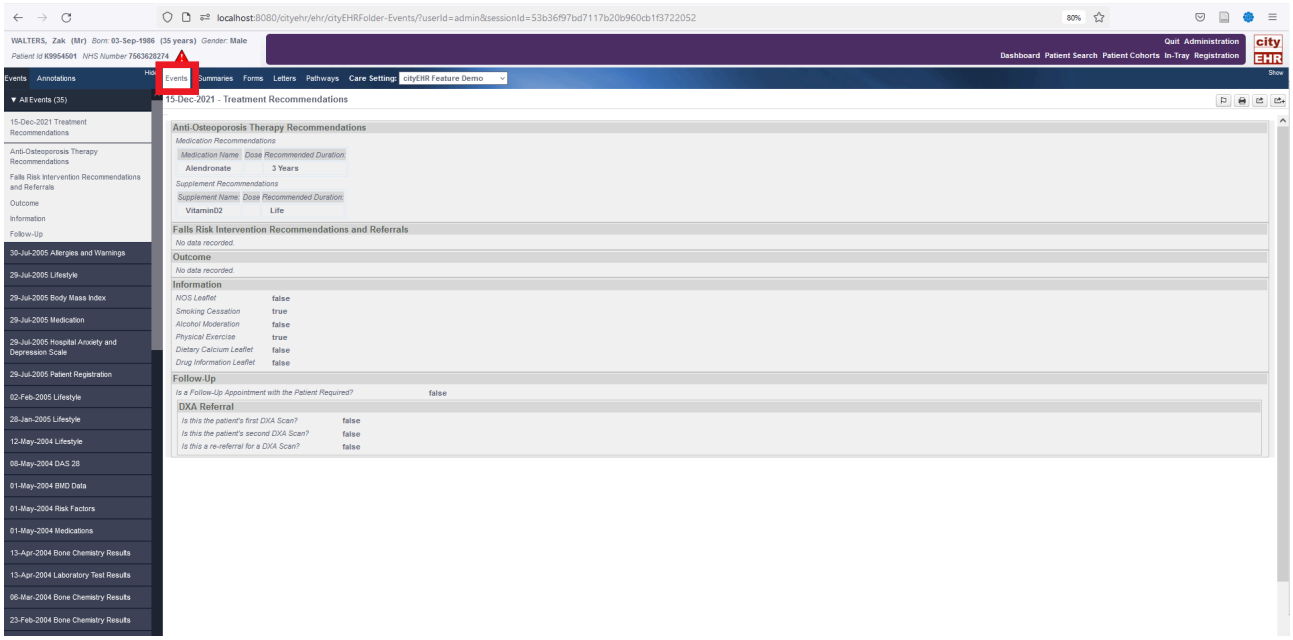
7. When finished, press the **Close** button at the top of the dialogue to dismiss the window.



Dismissing the Dialogue Window Using the Close Button

Viewing the Longitudinal Record

To view all events recorded for a patient, navigate to the **Events** tab at the top of the viewing pane.



Viewing all the Events in the Patient Record

1. The left-hand panel displays a list of all recorded events. Details of the most recent event are shown in the main viewing pane.

2. Select any historic event from the list to display its details in the main viewing pane.

Annotations and Notifications

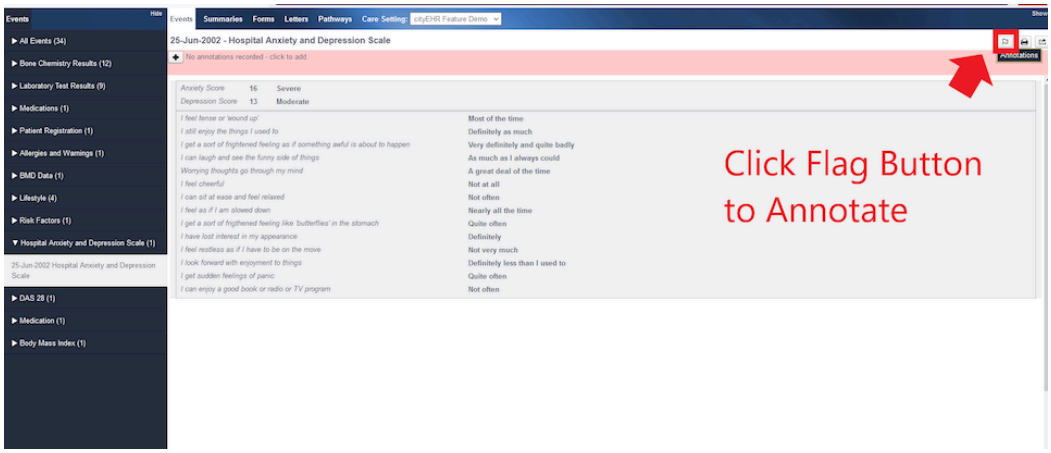
The **Events** page provides access to the full longitudinal record. While cityEHR prevents modifications to committed (published) events, users can add annotations to enhance or provide context to existing entries.

1. Select a historic event, such as a **Hospital Anxiety and Depression Scale (HADS)** assessment, to annotate.

Selecting a Historical Hospital Anxiety and Depression Scale Form for Annotations

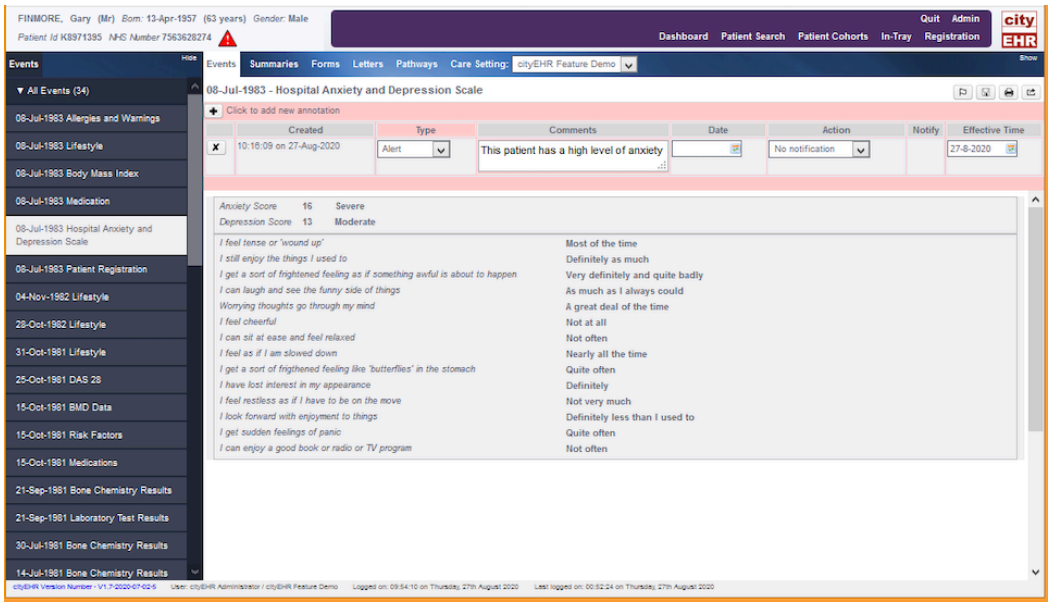
2. Click the small **Flag** button at the top-right of the record view. This will display the annotations for this event.

3. Click the **'+'** button at the top-left to create a new annotation.



Clicking Flag and '+' Buttons to Annotate

4. Enter the **Type** and **Comments** for the annotation, then press **Save** in the top-right menu to commit the annotation.



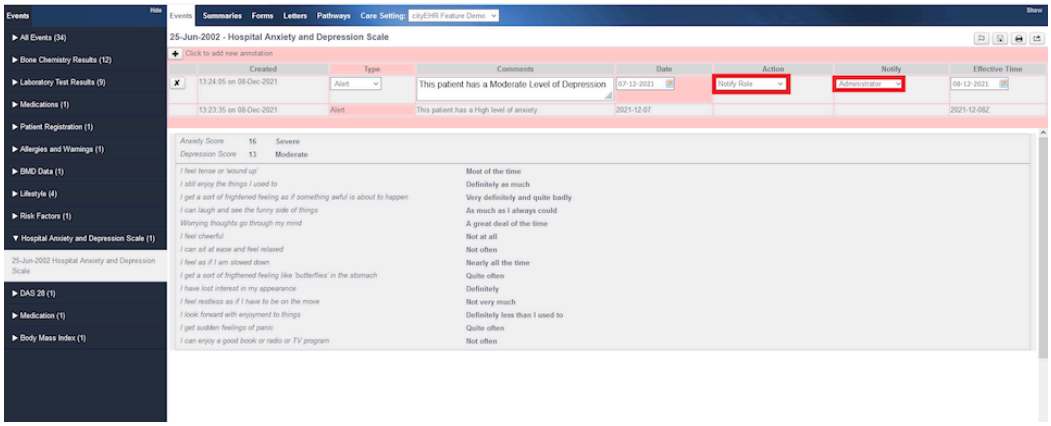
Annotating a Hospital Anxiety and Depression Scale Form

5. The saved annotation is stored as a new event in the patient record, linked to the original annotated event.

6. Annotations can also serve as notifications for other clinical users regarding specific events in the patient record.

7. To notify a user, create a new annotation and use the **Action** drop-down menu to select the intended user(s).

8. For fresh cityEHR installations, with only an administrator user, select **Notify Role** as the action and choose **Administrator** from the drop-down.



Notifying Administrator Using Annotations

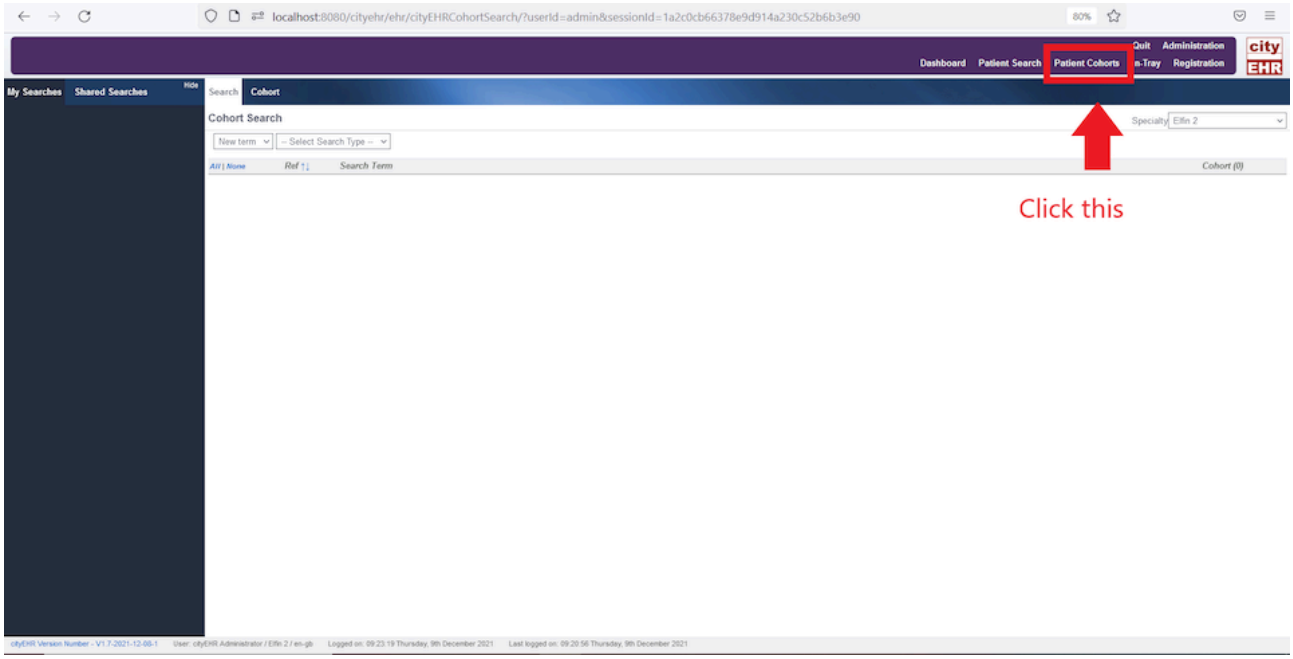
9. Complete the notification details and press **Save** to commit the annotation. The notified user will receive a message in their **InTray**, which is covered in a later section of this guide.

Cohort Search

The cohort search facility allows you to:

- Make cross-patient searches on any entry/element in the information model.
- Combine cohorts returned from individual searches.
- Save searches and patient cohorts.
- Reload searches and cohorts that have been saved previously.
- View and print cohort lists.
- Export patient data for a cohort.

To run cohort searches, press the **Patient Cohorts** button in the main cityEHR navigation panel (available at the top of every page).

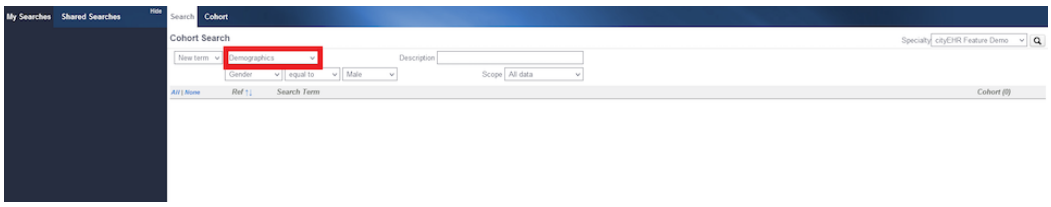


Running Patient Cohort Searches

The sections below demonstrate cohort search features using a small test database (e.g., the data generated in the "Generate Test Data" section).

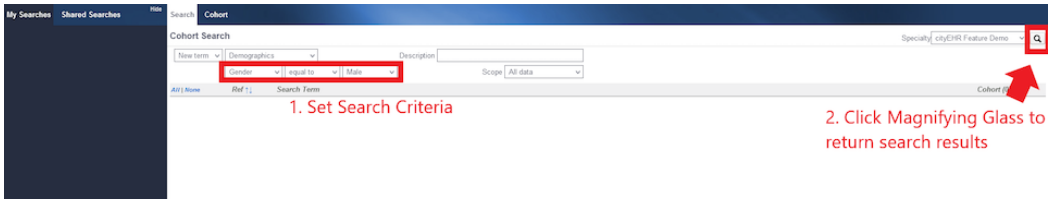
Demographics

1. Navigate to **Patient Cohorts** in the in the system navigation.
2. To search for cohorts based on patient demographics, select **Demographics** (default on page load) from the left-hand search type selection.



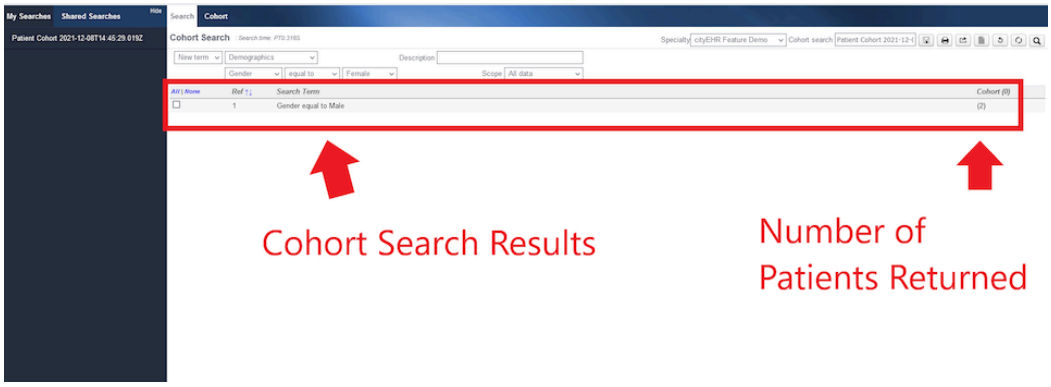
Searching for Cohorts Using Demographics

3. Select to search on **Gender**, **Date of Birth**, or **Age**. Enter search criteria and press the **Search** button to display a summary of the cohort found.



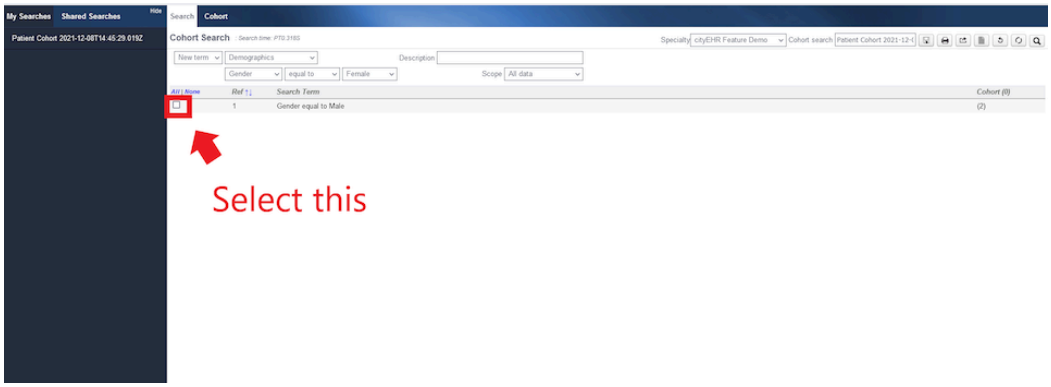
Searching for Patients Using Gender as a Demographic

4. View the Cohort Results in the display window.



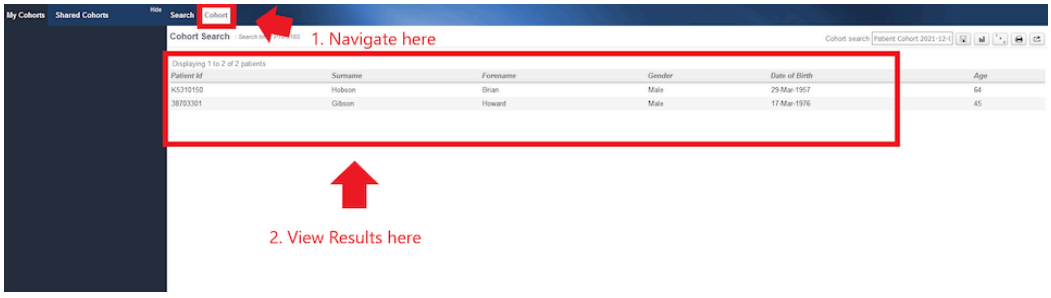
Viewing Cohort Results in the Display Window

5. Select the check-box next to the **Cohort Search Results**.



Selecting the Box Next to the Cohort Search Results

6. Navigate to the **Cohort** tab (next to the **Search** tab). You can now view the patients in this cohort (see figure below).

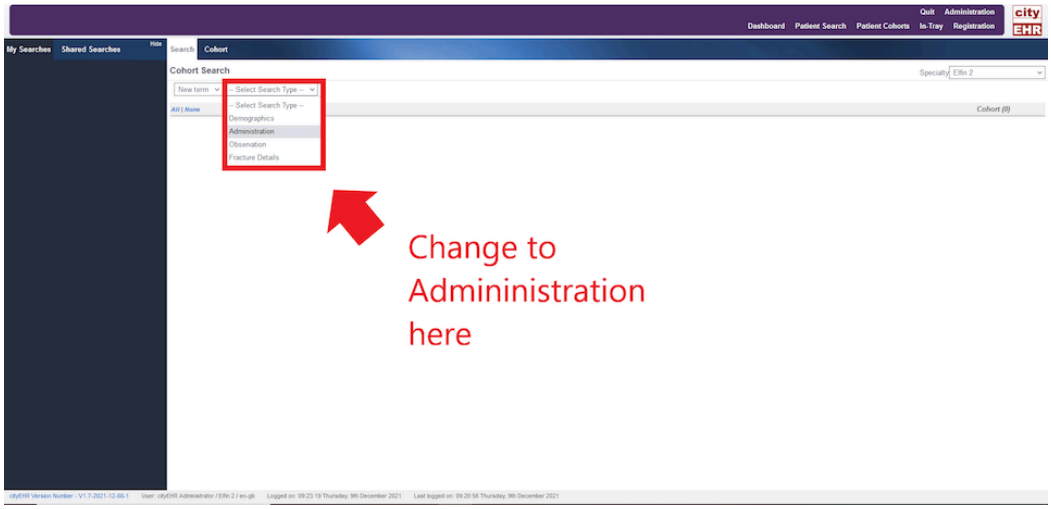


Viewing Patients in Selected Cohort

7. You can now print or export this list. Refer to further sections for printing instructions and exporting data.

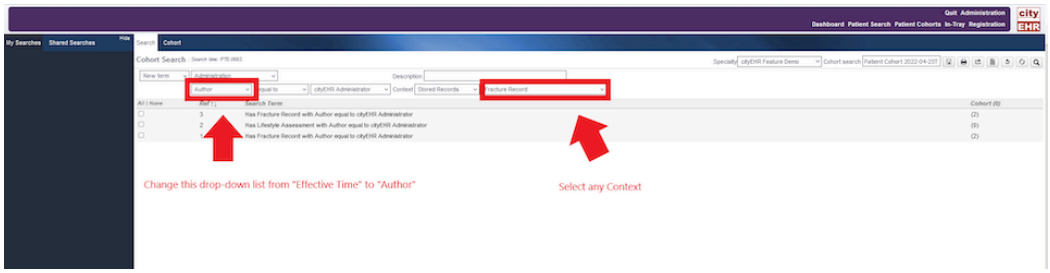
Administrative Data

1. Select **Administration** from the left-hand search selection menu to search for cohorts based on the effective time or author of specific compositions.



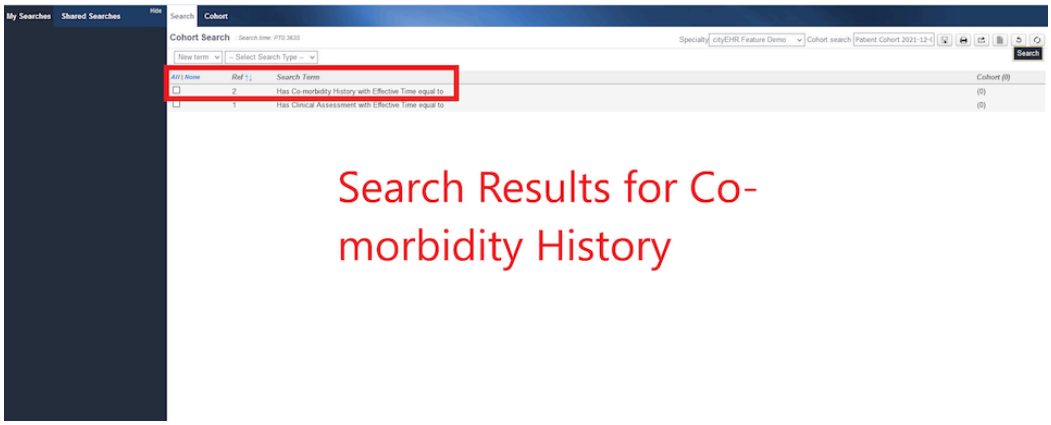
Searching for Cohorts Using Administration

2. The cohort is formed as patients who have any compositions of the specified type with the author or effective time as constrained by the search criteria. If no context is chosen then the cohort is formed based on any composition e.g. find all patients with any compositions committed by a specific author (user). Select the search criteria to be **author** and select any option from the context drop-down (see figure below).



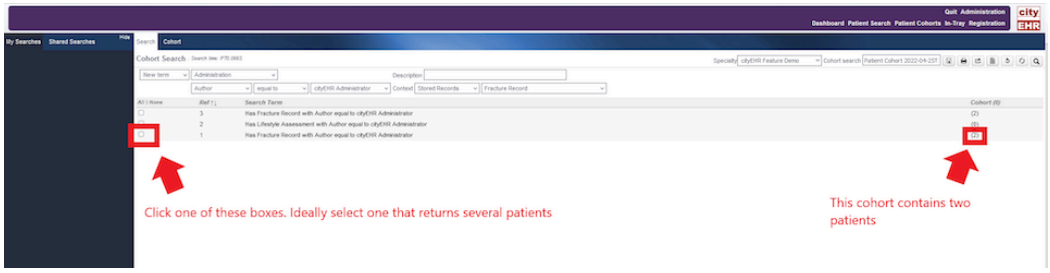
Searching for Cohorts Using “Author” as Search Criteria

3. Click the **Search** button (magnifying glass) to return results.



Search Results for Co-morbidity History

4. Select the check-box next to the **Patient List**.

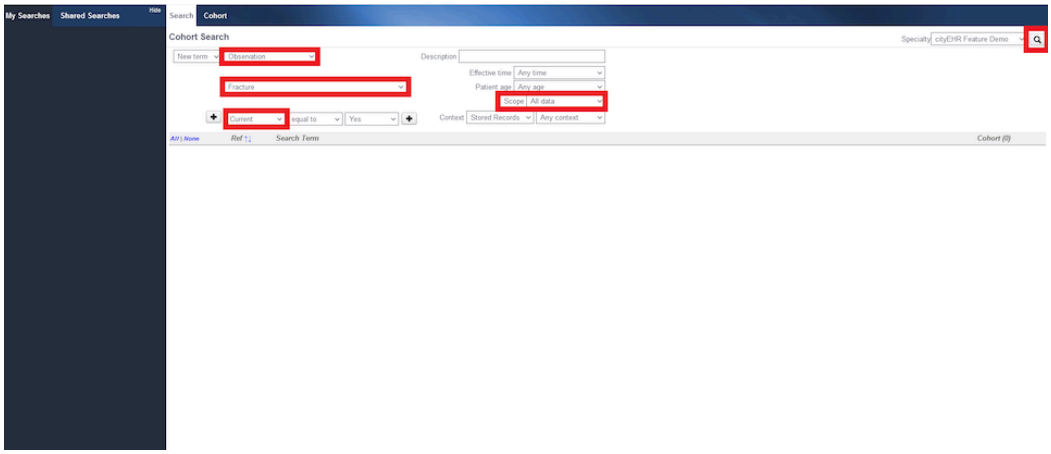


Clicking on Empty Box of New Patient List

5. Navigate to the **Cohort** tab to view a list of patients from your search results.

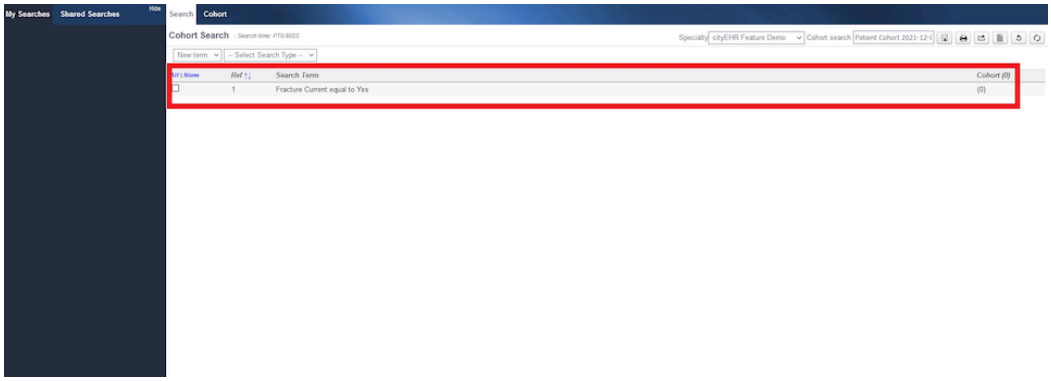
Observations

1. Set the search term to **Observation**. Adjust the parameters to refine your cohort searches for specific observations. Ensure you click **Search** to display the results.



Changing Cohort Search Term to Observation

2. In this example, the **Observation** is set to "Fracture," with **time** set to *Current* and **Scope** set to *All Data*. Review the search results, as shown in the figure below.



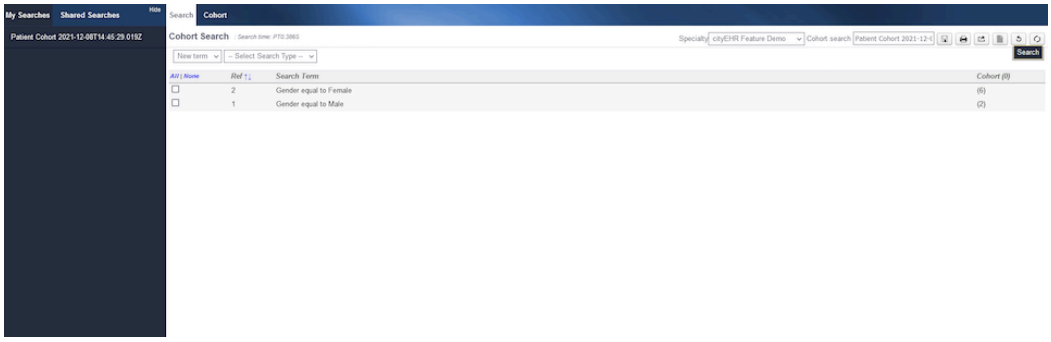
Cohort Search Results for “Observation” as Fracture

3. If no results are returned for the observation, modify the search parameters to explore different results.

Combining Cohorts

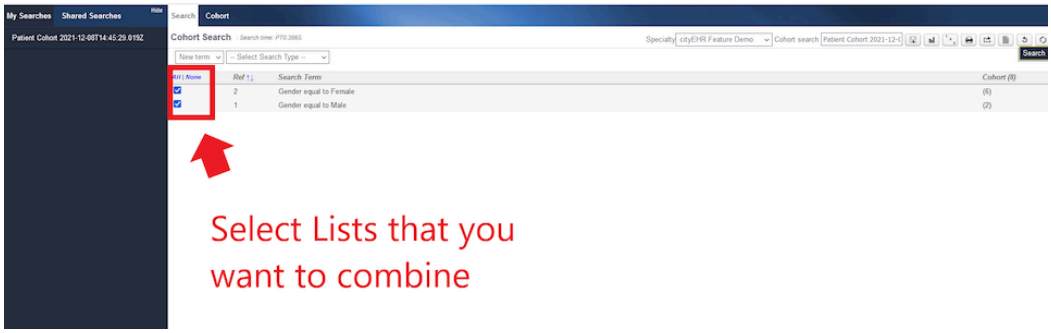
The cohort search functionality enables you to combine multiple searches. Follow the steps below to learn how to combine cohorts:

1. Conduct the individual cohort searches you wish to combine. For example, searches for **Gender equal to Female** and **Gender equal to Male**, as shown in the figure below.



Two Cohort Searches (Female and Male Demographics) for Combining

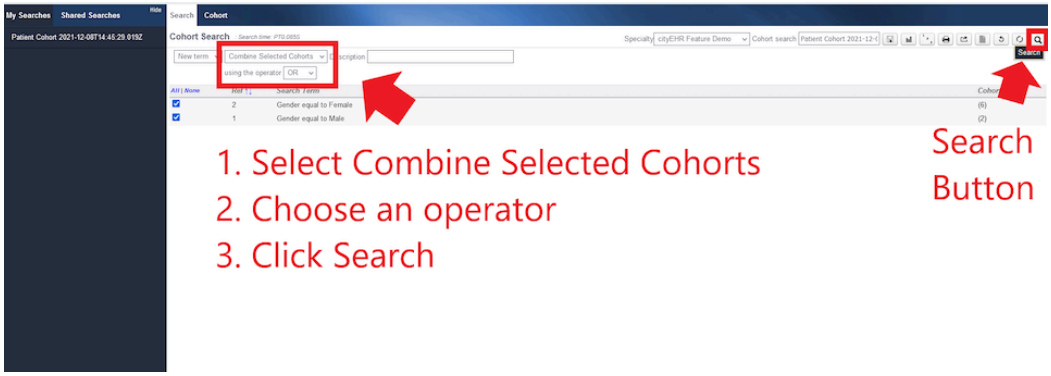
2. Select the cohorts to be combined by checking their respective boxes.



Selecting Cohorts to Combine

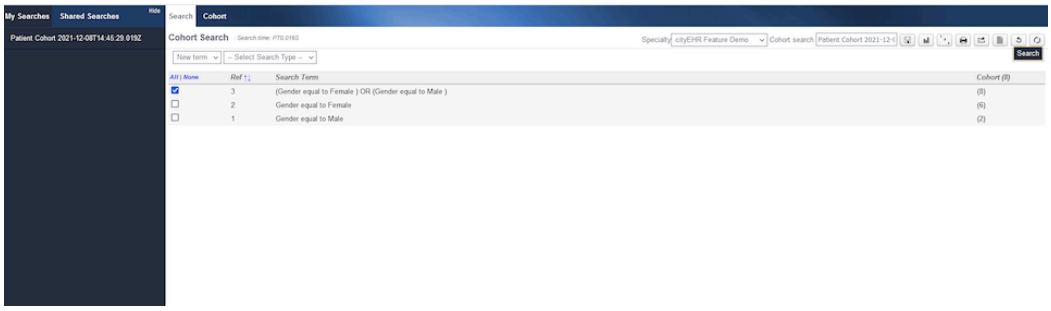
3. From the **Select Search Type** menu, choose **Combine Selected Cohorts**, select an operator, and click **Search**. You may also select **Combine Cohorts**. Available operators include:

- **AND**: Returns members common to both cohorts.
- **OR**: Returns all members from both cohorts.
- **A PERCENTAGE OF**: Finds members of cohort A that are also in cohort B and calculates the percentage.



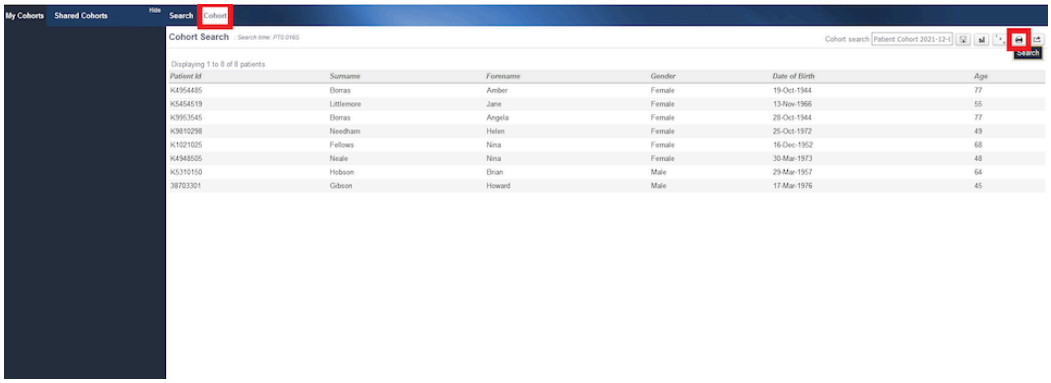
Choosing an Operator to Combine Cohorts

4. View the combined results in the display window, select them, and save the cohort search for future use.



Combined Cohort Results

5. Navigate to the **Cohort** tab to view the combined cohort list. To print this list, click the printer icon in the top-right corner.

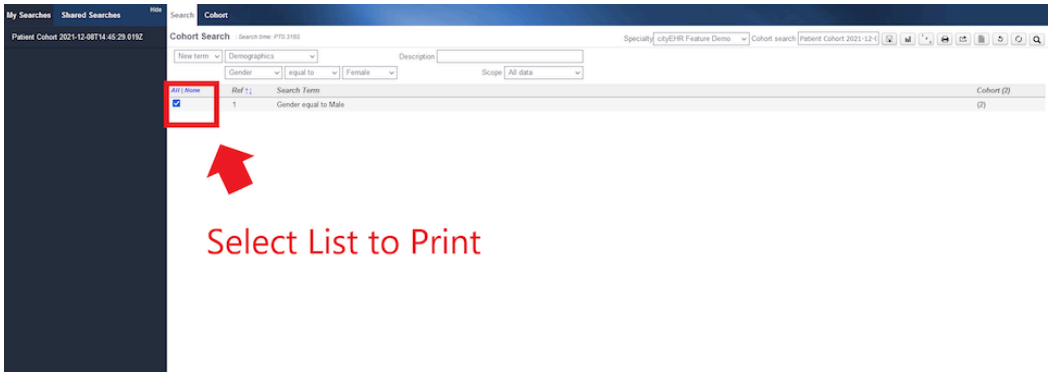


Printing Combined Cohort Results List

Printing Cohort Lists

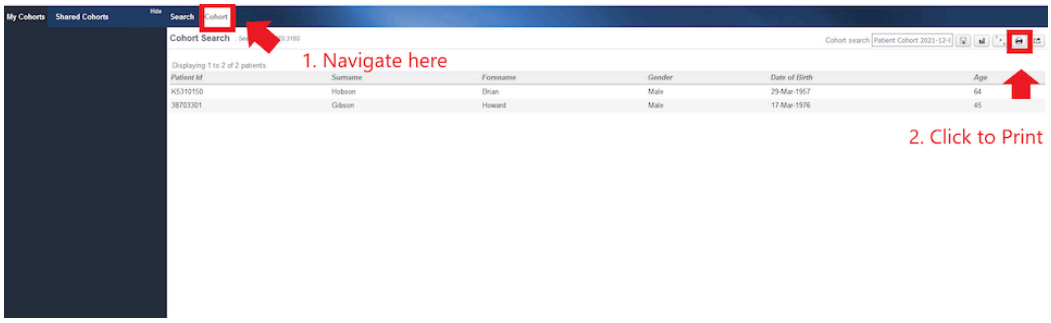
Follow these steps to print cohort lists:

1. Select the cohort list(s) you want to print from the search results.



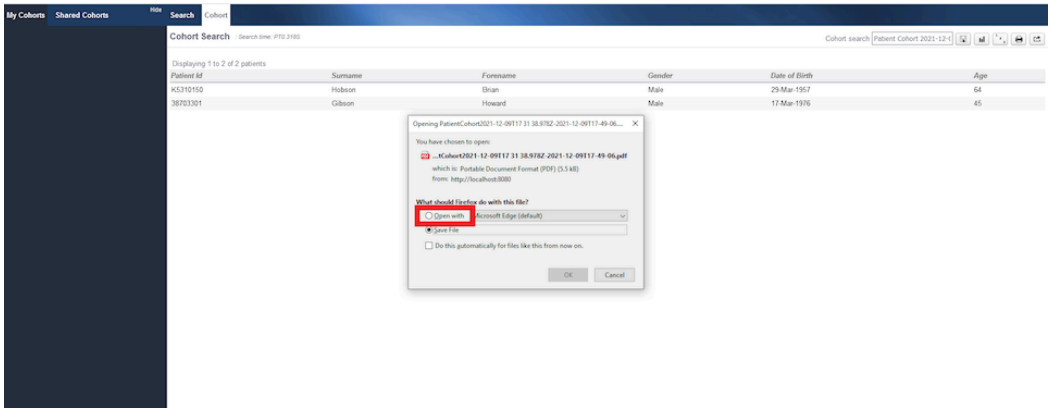
Selecting the Cohort List(s) for Printing

2. Navigate to the **Cohort** tab and click the print icon.



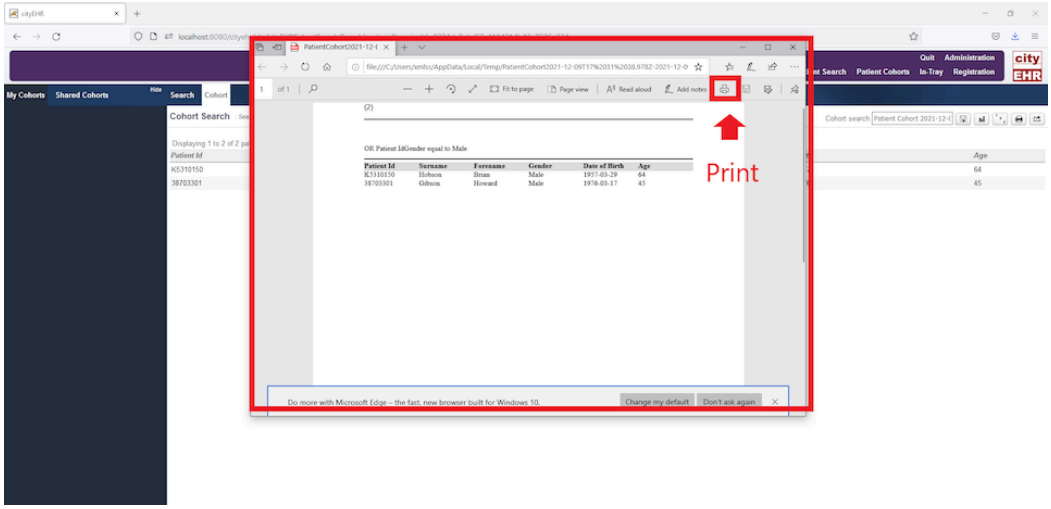
Printing the Selected Cohort List(s)

3. Choose **Open File** and select the application to open the cohort list.



Opening Cohort Lists in Desired Application

4. Print the cohort list from the selected application.



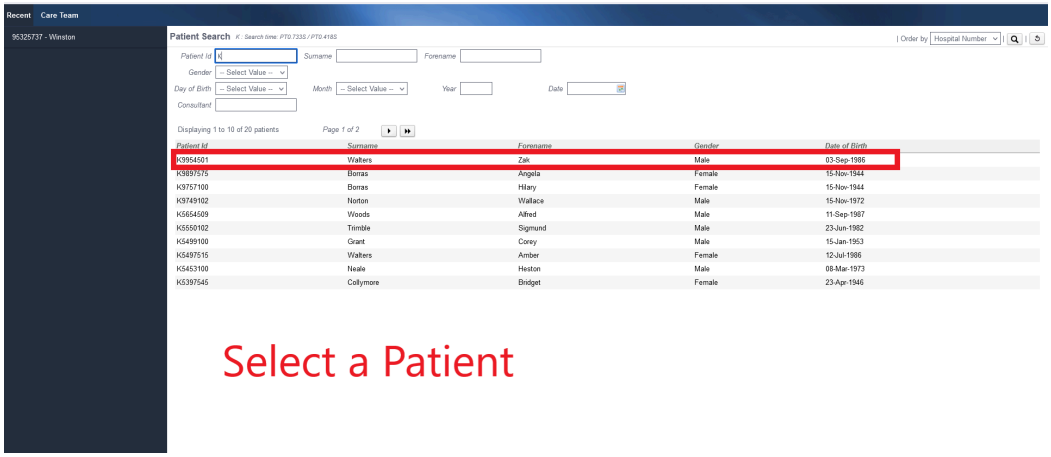
Confirmation of the Cohort List(s) Print

Exporting Patient Data from cityEHR

Patient data can be exported in a number of different formats for individual patients or for cohorts of patients found through the cohort search facility.

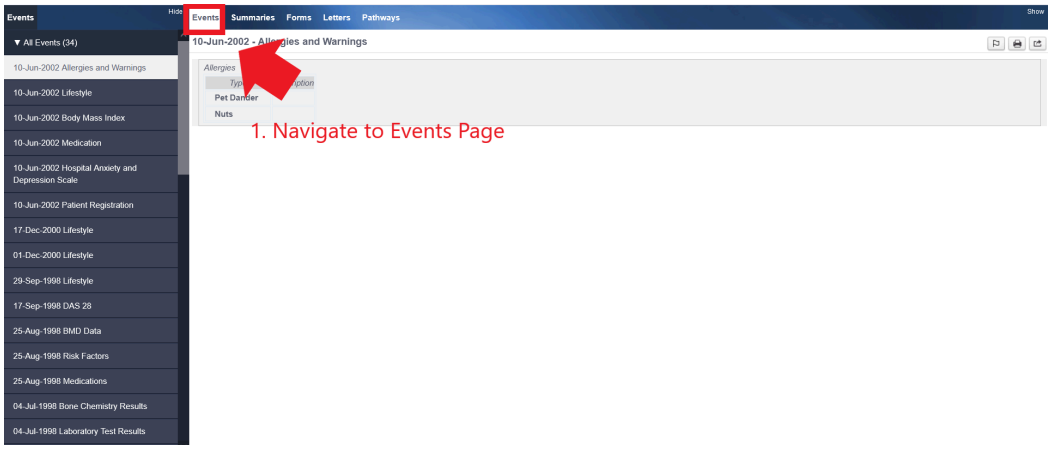
Exporting Data for an Individual Patient

1. The full record for an individual patient can be exported from the patient Events page. Click on a patient in Patient Search for whom you would like to export their record.



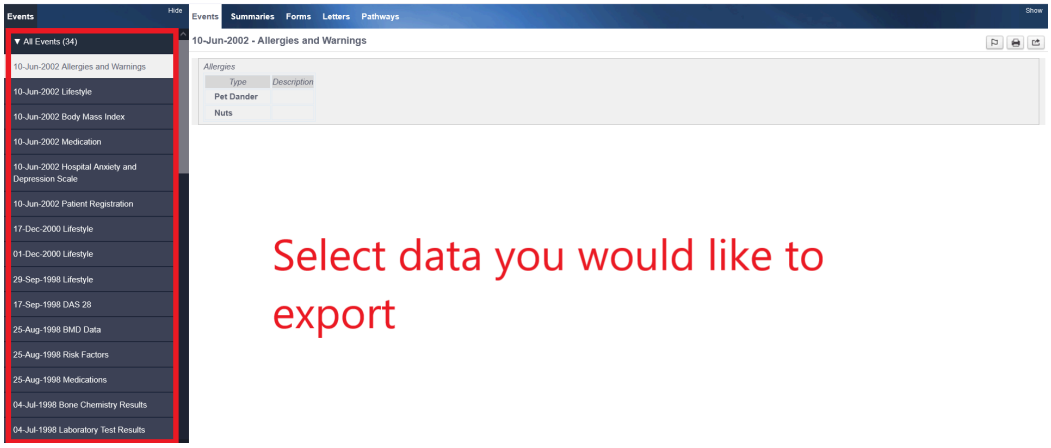
Selecting a Patient for Record Export

2. Navigate from the **Summaries** page to the **Events** page.



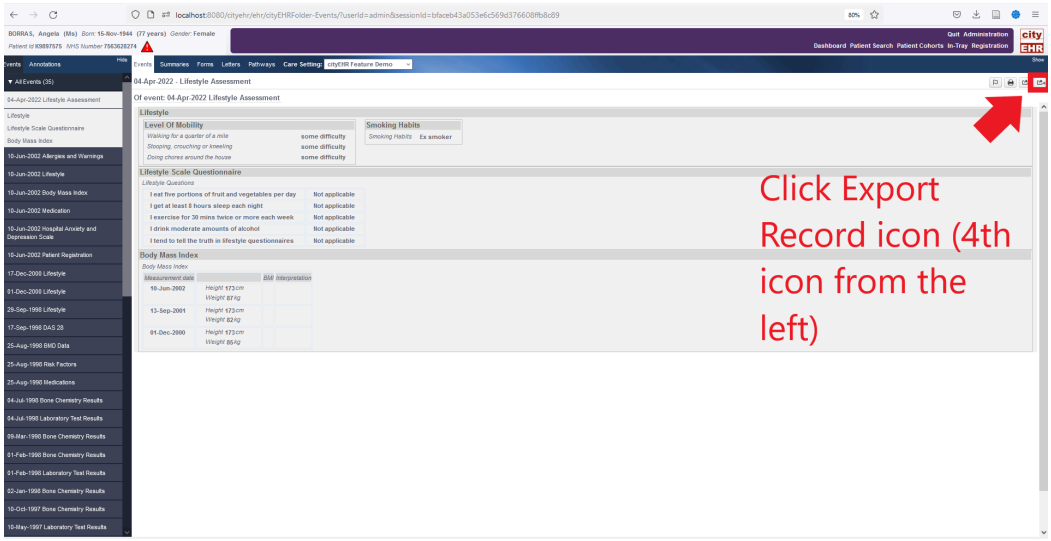
Navigating to Patient Events Page

3. Select the event you would like to export.



Selecting Patient Event to Export

4. Click the **Export Record** icon to export the individual patient data.



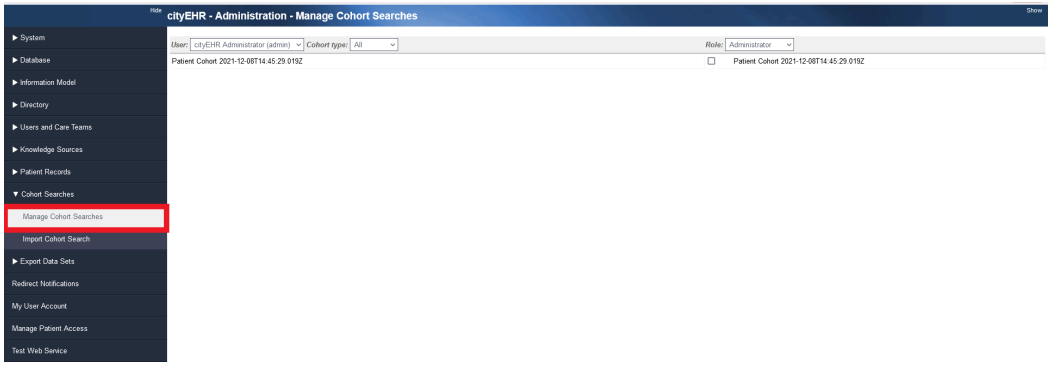
Selecting Patient Event to Export

Exporting Data for a Cohort of Patients

Data can be exported in various formats for patient cohorts created through cohort searches.

1. Navigate to the **Administration** screen in the Purple system navigation.

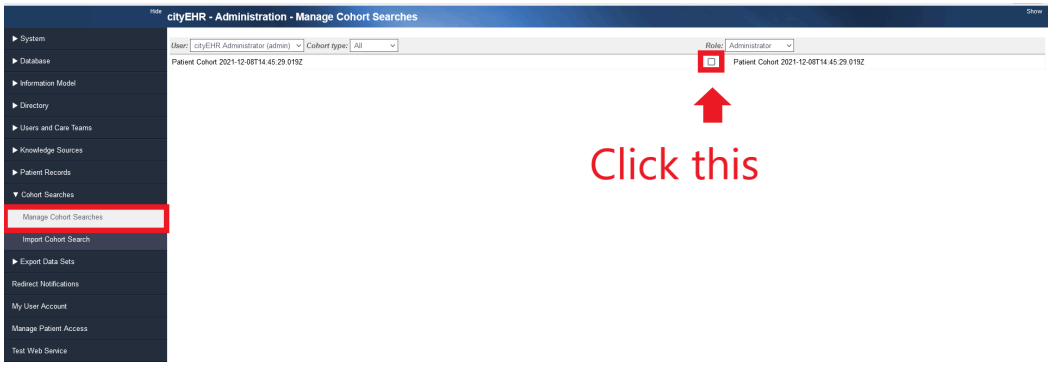
2. Navigate to **Cohort Searches** in the menu on the left side of the screen, and then click **Manage Cohort Searches**.



Manage Cohort Searches Page

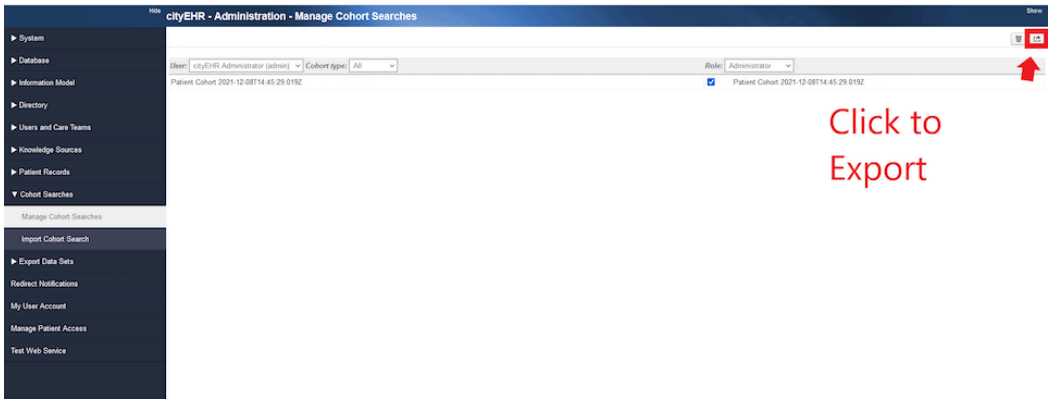
3. View your saved cohort searches in the main display screen.

4. Select the box next to the cohort search you wish to export.



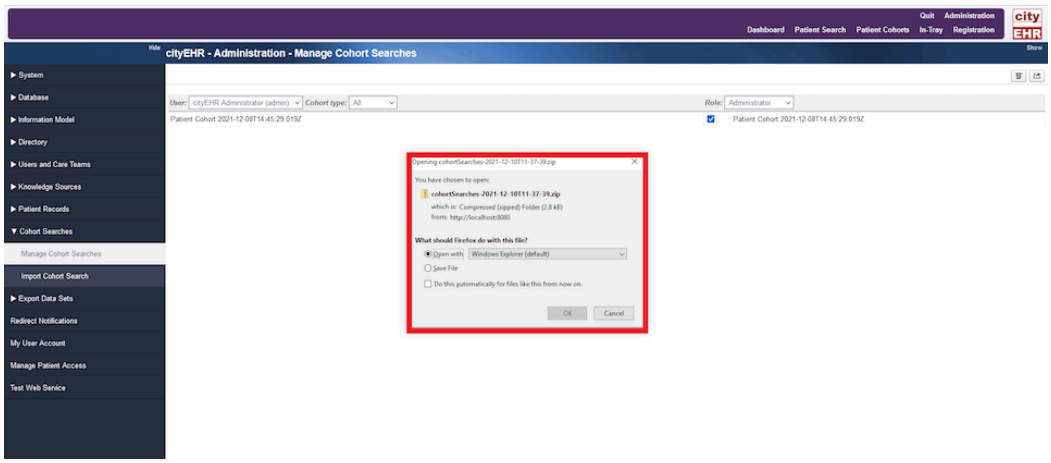
Selecting Desired Cohort Search for Export

5. Click the **Export** button that appears at the top right of your screen.



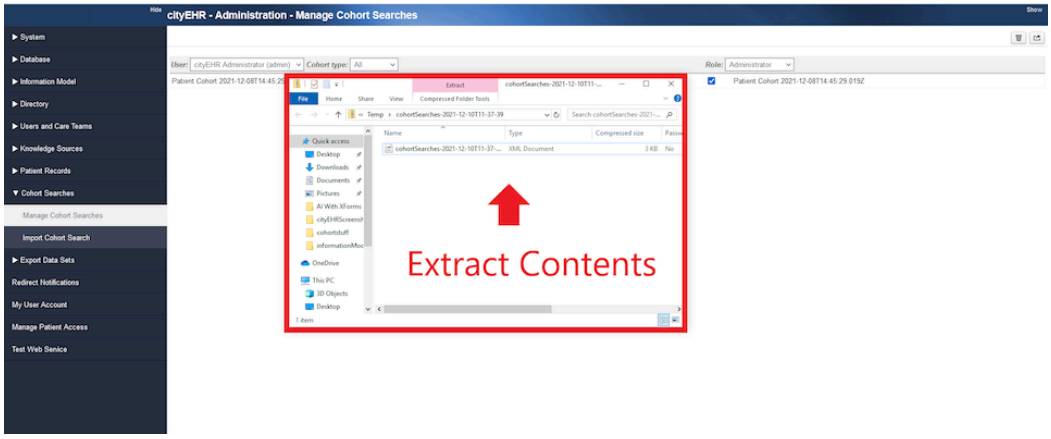
Exporting Desired Cohort Search

6. A dialogue box will appear. Save your exported file or open it with a default application.



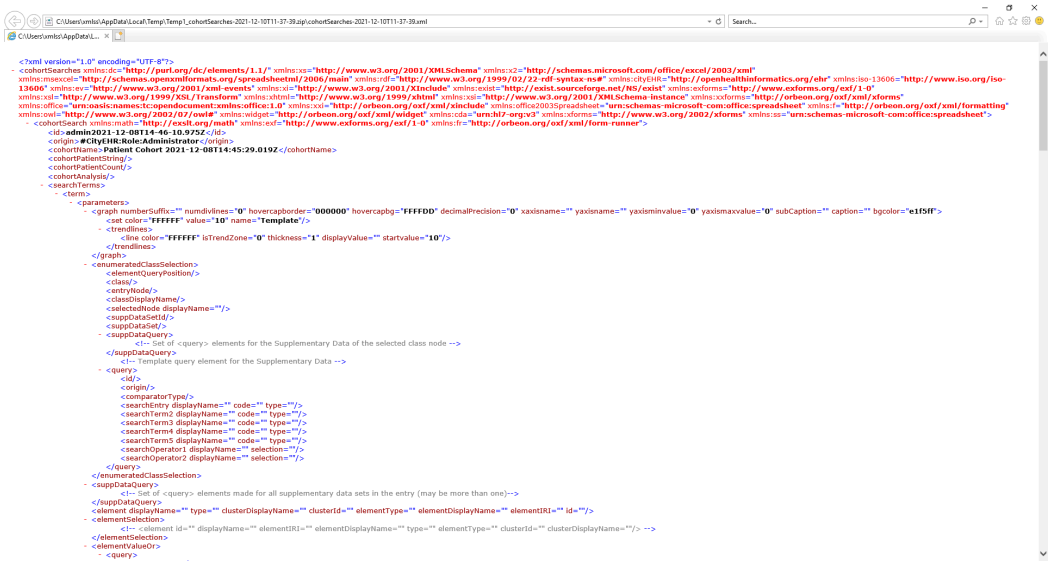
Cohort Export Dialogue Box

7. For this example, open the file with **Microsoft Edge**.



Extracting the Exported Cohort File's XML Contents

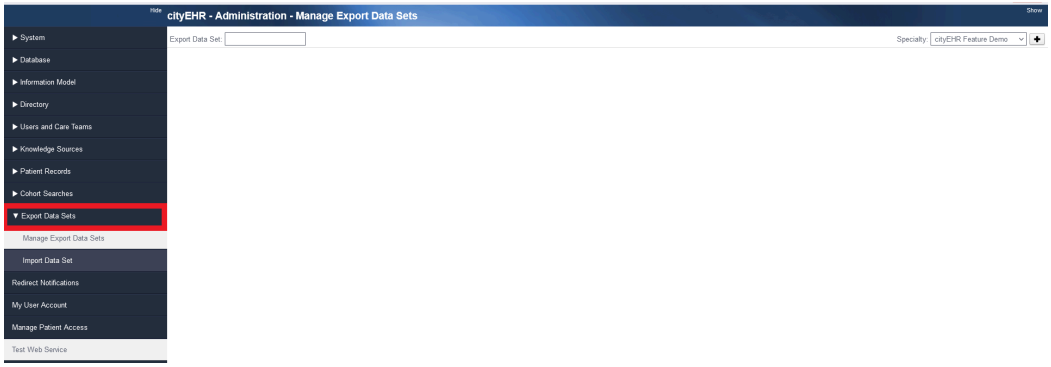
8. Extract the XML contents, and a new window will open displaying the XML of the exported data.



Window displaying extracted cohort XML file

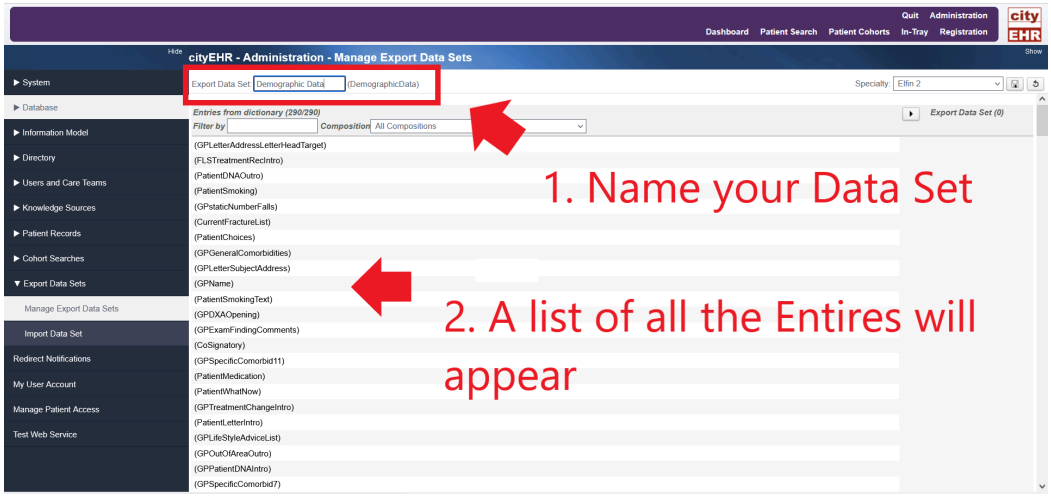
Export Data Sets

1. Navigate to the **Administration** screen in the Purple system navigation.
2. Navigate to **Export Data Sets** in the menu on the left side of the screen.



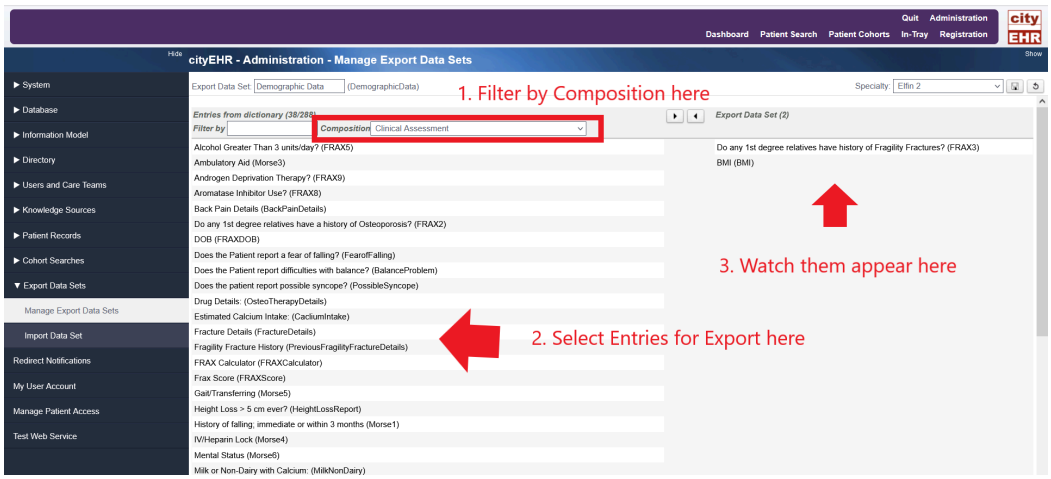
Manage Export Data Sets Page

3. Enter a name for your data set.



Naming the Data Set

4. Select the entries you want to add to your exported data set. These will appear in the column on the right. You can also filter entries by composition by using the drop-down menu next to **Composition**.



Selecting Entries to Add to Exported Data Set

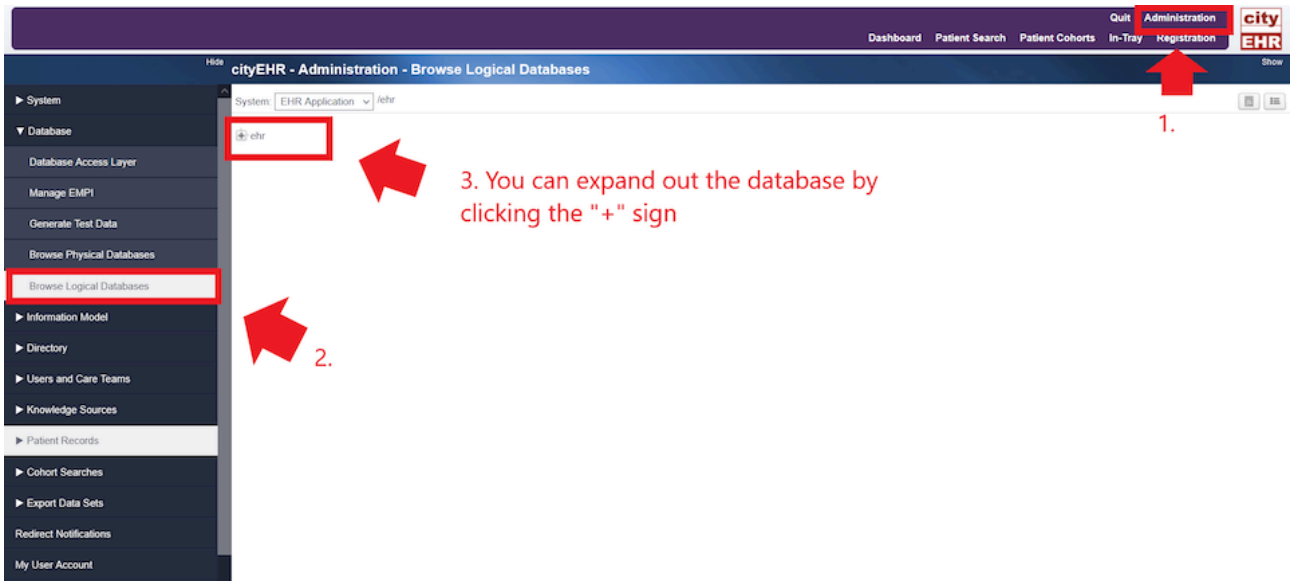
5. Click the **Save** button at the top right of the display window.

Inspecting the XML Store

The native XML database used in cityEHR can be browsed using tools in the Administration page. This functionality is useful for understanding how data is stored and can assist administrators in managing database contents. However, the facility to remove data must be used with extreme caution as it may invalidate the XML store's structure and/or compromise patient records.

Browsing Logical Databases

Open the **Administration** page and select **Browse Logical Databases** within **Databases** from the menu on the left-hand side of the display screen. The logical database will display all databases as if they are part of one database, whereas the physical database shows the different nodes within that database.



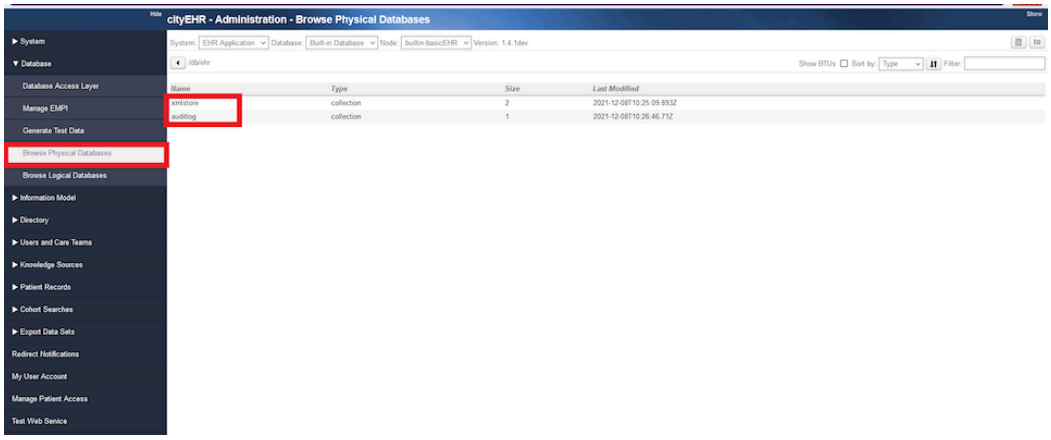
Browse Logical Database Page

Browsing Physical Databases

1. Open the **Administration** page and select **Browse Physical Databases** from the menu on the left-hand side.
2. Two separate databases are available as the root for browsing:

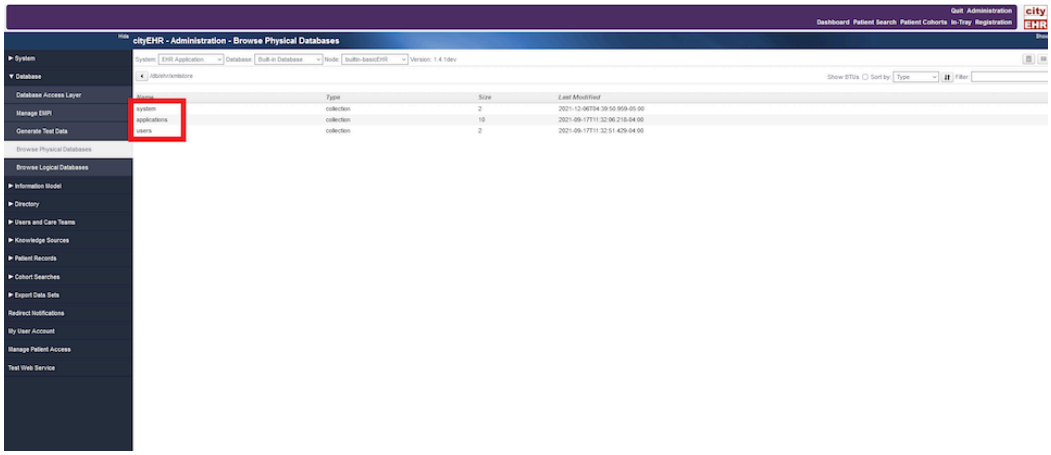
    - **XML Store** — stores users and patient records for all installed applications.
    - **Audit Log** — stores audit data for all users.

3. Select the database store you wish to browse. For this example, select **xmlstore**.



Browse Physical Database Page

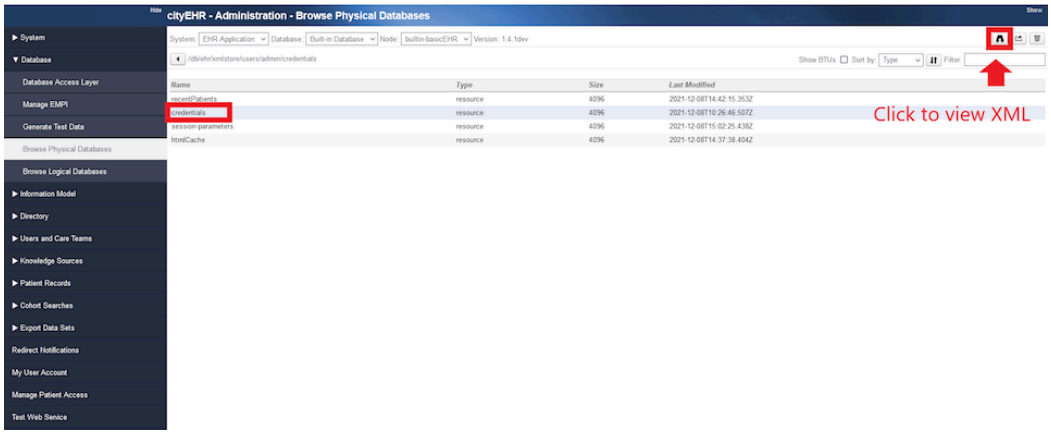
4. The top level of the **xmlstore** database contains collections for **Applications**, **Systems**, and **Users**. Any cityEHR installation can support multiple applications and a single set of users, each of whom has access to one or more applications.



browse Physical Database "xmlstore" Page

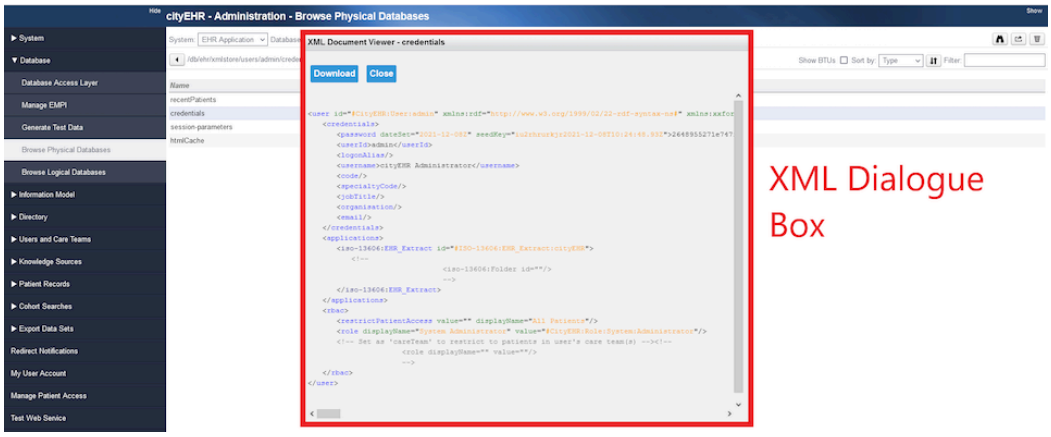
5. Click on the **users** link to view a list of all registered users. Initially, this will include only the default **admin** user and any others you imported or created previously.

6. Click on the **admin** link, then on **credentials**. Click the binoculars icon at the top right of the viewing panel.



Viewing "xmlstore" Page Credentials

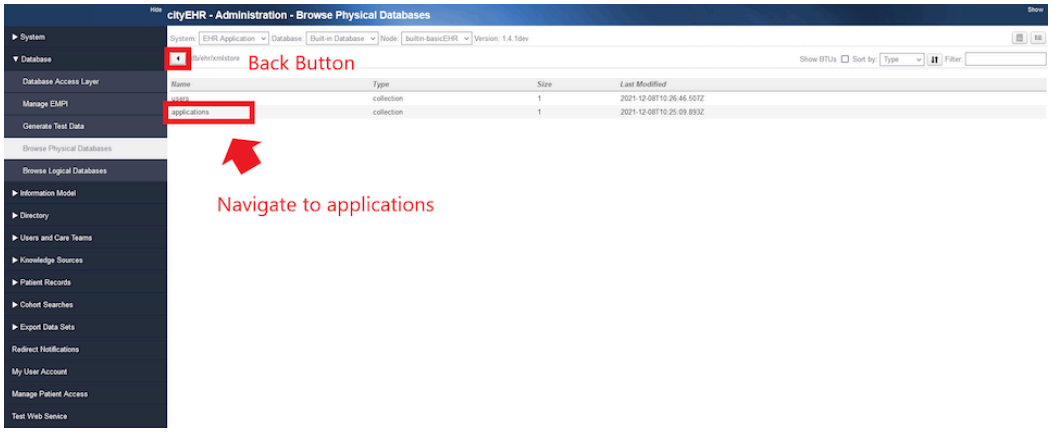
7. An XML document containing the user details (*users.xml*) will appear in a new dialogue window.



XML Document of User Details

8. You can download the XML to view it in a text editor.

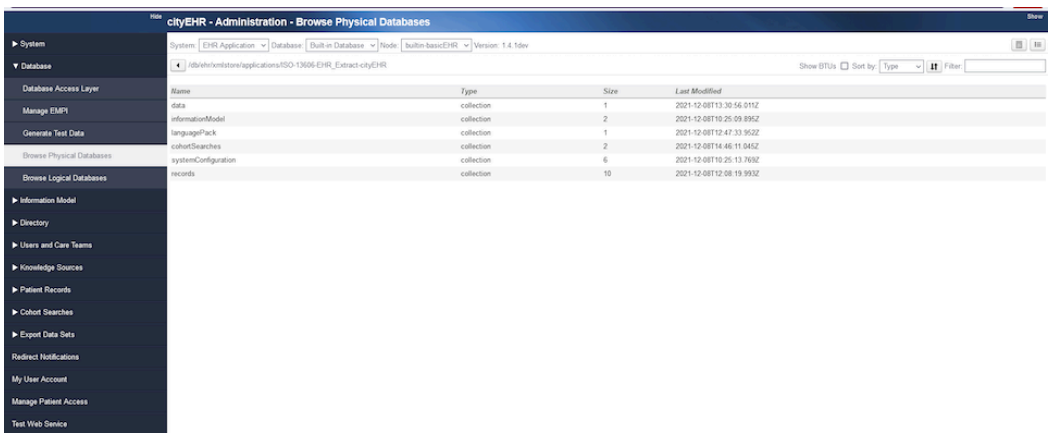
9. Return to the top level of the **xmlstore** by clicking the back button located next to the database selection drop-down (not the browser's back button).



Returning "xmlstore" Top Level by Clicking the Back Button

10. Click on the **applications** link, then the link for **ISO-13606-EHR_Extract-cityEHR**.

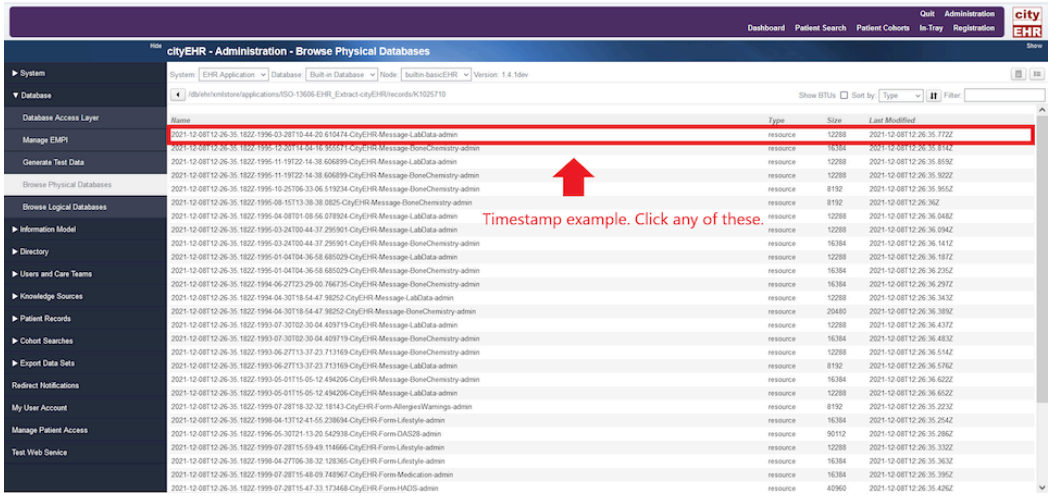
11. This displays the top-level collections for the default cityEHR application.



Top-Level Collections for the Default cityEHR Application

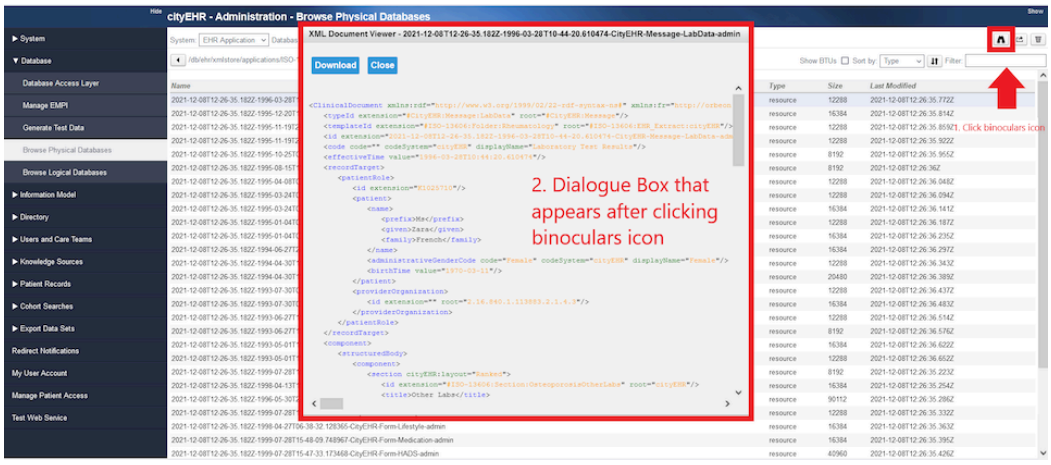
12. Click on the **records** link to see a list of patients with stored records for this application.

13. Click on a patient's link to view a list of timestamped compositions (XML documents in HL7 CDA format) representing the events stored in their record.



Patient Timestamped Compositions

14. Click on a timestamp, then on the binoculars icon to view an HL7 CDA document for the selected event.



HL7 CDA Document for Selected Event

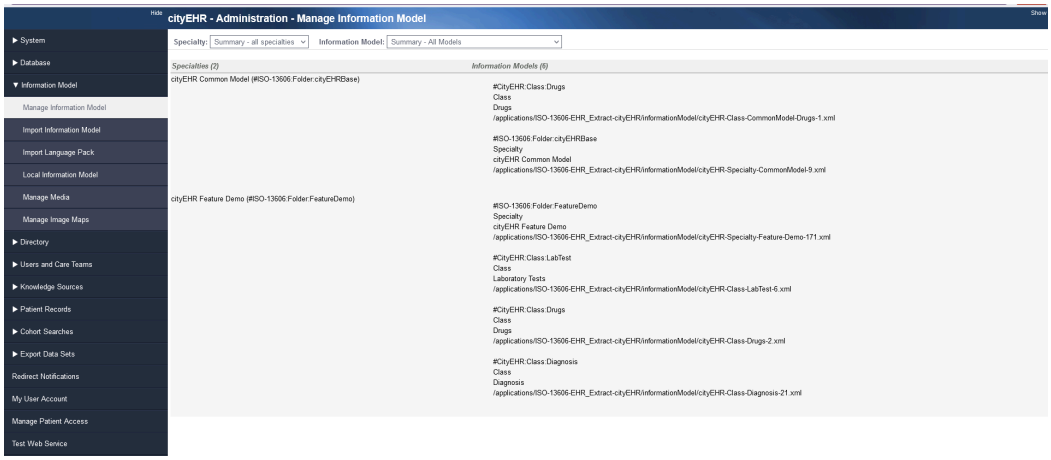
15. Continue exploring the database, such as the **ISO-13606-EHR_Extract-cityEHR** collection, to view contents stored for the information model (OWL XML files) and the system configuration (templates for forms, letters, and data dictionary).

Manipulating the Information Model as an Ontology

This topic guides users through browsing, exporting, editing, and importing ontology-based information models in cityEHR using Protege.

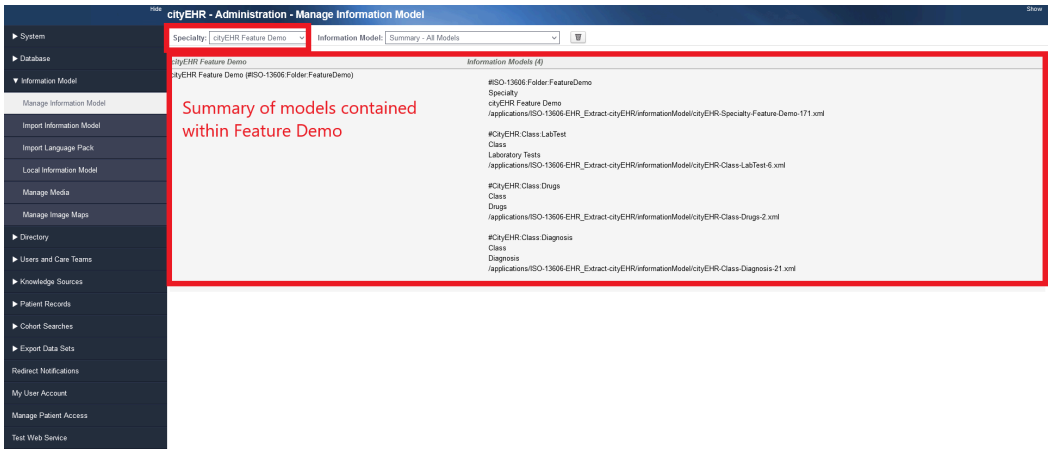
Browse the Ontology in cityEHR

1. Move to the Administration screen by pressing the button in the top right corner of the screen. Then, move to Information Model in the Menu on the Left of the Screen. You should land on “Manage Information Model”. You will see a summary of the information models loaded for this installation (if not, press the selection to Manage Information Model in the left hand menu).

2. 

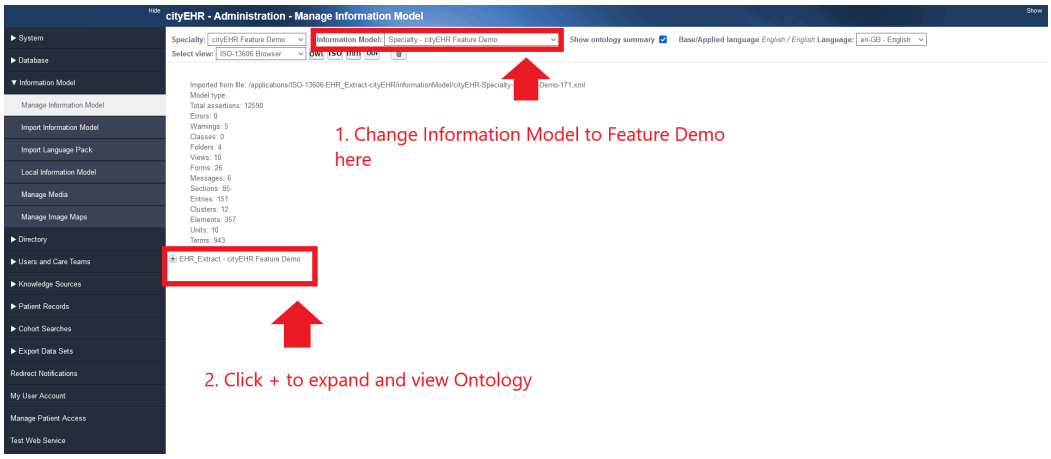
Base Manage Information Model screen

3. In the selection for Information Model, find the model for Specialty - cityEHR Feature Demo. This is the model that was driving the interaction with the cityEHR that you have just encountered.



Selecting cityEHR Feature Demo information model

4. The model is loaded to cityEHR as an ontology which you can browse by selecting “Feature Demo” from the Information Model drop down shown below. You can then expand the ontology by clicking the + sign. See image below.

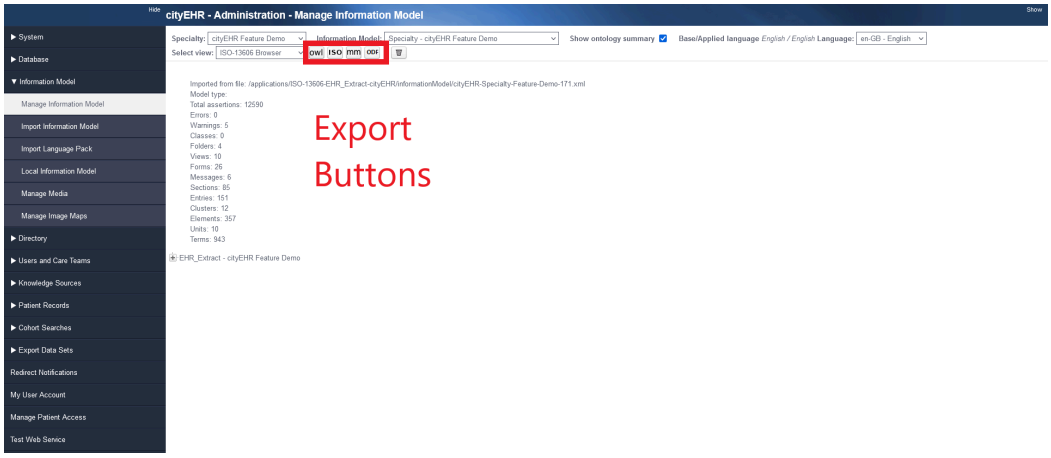


Changing information model and viewing ontology

5. You can browse through the ontology by expanding the tree controls - you should see the Folders, Views, Forms, Sections and Entries for the screens you have already worked with. You can select any of the loaded models and browse either as ISO-13606, data dictionary contents, class hierarchies and class nodes, depending on the type of the model (specialty or class hierarchy).

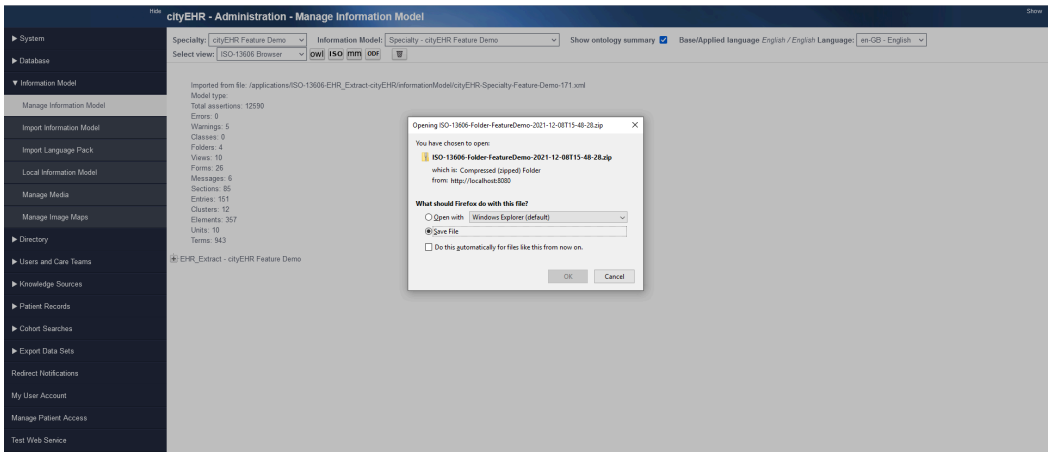
Export the Ontology and Open in Protege

1. Export the ontology by clicking the **Export** button at the top-right. Select **OWL** to download the ontology as a zip file.



Exporting Ontology models

2. Save the file on your system. Rename it to use a **.zip** extension and unzip it to obtain the ontology (an OWL/XML file). Rename the file to use a **.owl** extension for easier compatibility with Protege.



Renaming export file pop-up

3. Open the ontology in Protege. Start Protege, select **Open an existing ontology**, navigate to the unzipped file, and open it. You can also double-click the file if it has a **.owl** extension.

4. Use the **Classes** tab to view the class hierarchy and the **Individuals** tab for specific instantiations of the Feature Demo model.

5. Explore classes corresponding to ISO-13606, HL7 CDA, and cityEHR-specific components.

6. Under the **Object Properties** tab, expand **Top Object Property** to view all object properties in cityEHR. These are split into two sets, with names starting 'has' or 'is' - each named pair being the inverse of each other.

7. Similarly, use the **Data Properties** tab to view all data properties available in the architecture.

Edit the Ontology

In Protege, try adding a new section to a form or new entries to an existing section. Save your changes using **Save As** to preserve the original file in case of errors.

Note: Ensure you follow your workshop instructor's guidance to prevent issues in the ontology structure.

Load the Model to cityEHR

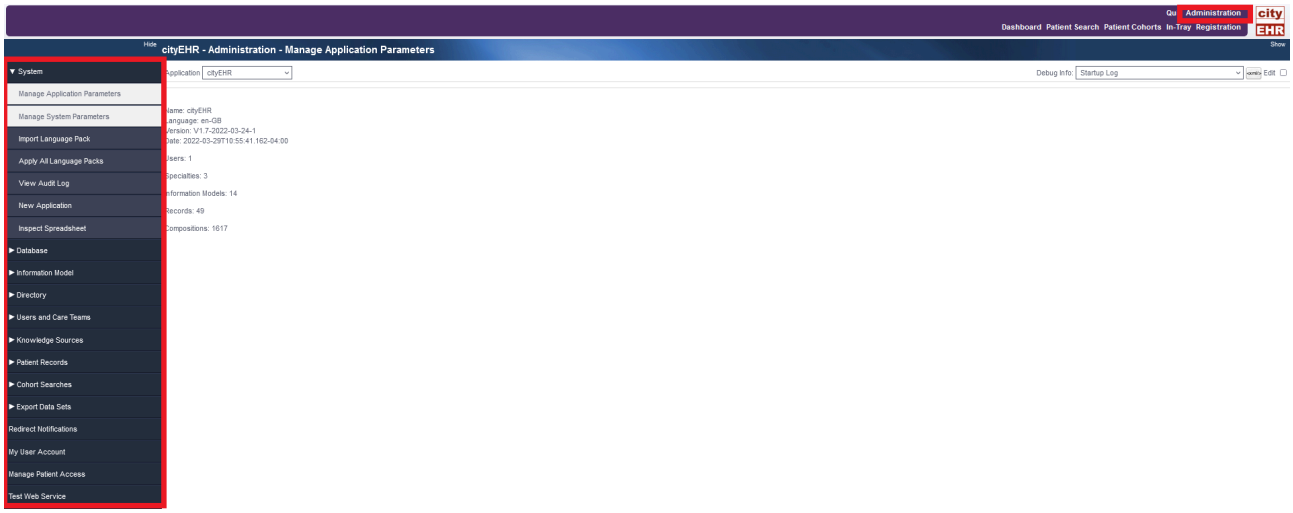
1. Return to the cityEHR Admin page and select **Import Information Model** from the left-hand menu. Browse to your OWL/XML file, upload it, and then click **Import**.

2. Once the import completes, a summary of the loaded model will appear. If errors are found, the model will not be loaded, and the errors will be reported.

3. After a successful import, return to the Patient Search screen. Select a patient and navigate to the updated form to verify the changes.

Manipulating the Information Model as a Spreadsheet

If you have administrative access, your Administration Page, Figure 109.



Administration Page

Manipulating the information model as an ontology is quite difficult and it is easy to make a mistake. There are several underlying reasons for this:

- the atomic assertions in an ontology mean that two or three related assertions need to be made to specify fairly simple associations (for example, to create a section which has a title and two subsections will take at least six separate assertions)
- ontologies are used to classify and reason, but are not good for constraining users in the models they can create - we can easily find that a model is inconsistent, but its not so easy to prevent users from creating an inconsistent model in the first place.

To get around these issues, and to create tooling that clinical users are able to work with more easily, the information model for cityEHR can also be created and modified using a standard spreadsheet package.

The open source Open Office spreadsheet is used to create a model in a way that is easier to control, in terms of the constraints that can be applied.

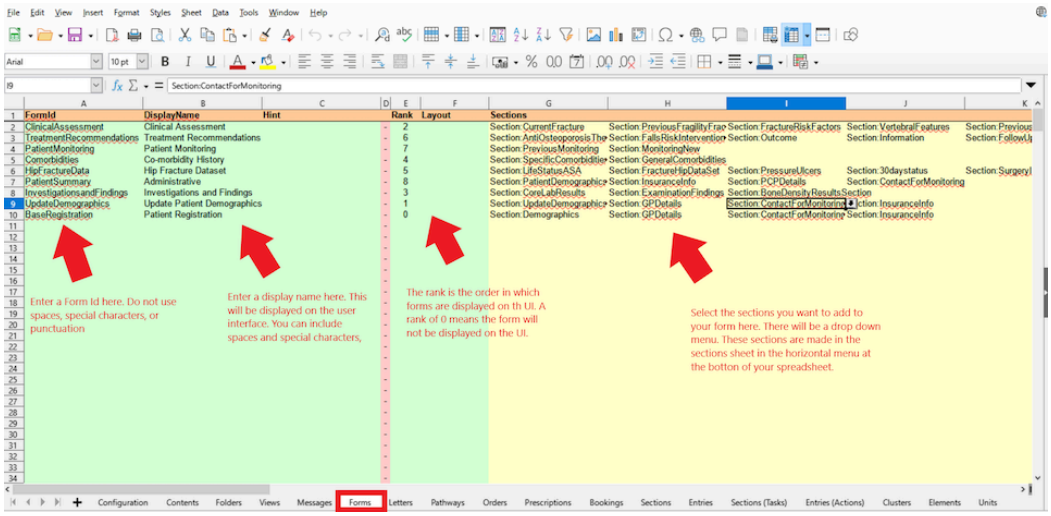
When the spreadsheet model is ready it is then saved as an XML file and is transformed from that to an ontology in OWL/XML format as it is loaded to the cityEHR.

1. Using Open Office, open the file cityEHR - Specialty - Feature Demo.ods in the information model directory of the materials
2. This is an open office spreadsheet set up with a cityEHR information model. It has about 20 sheets (see the tabs along the bottom left) and you will see that some of these correspond to components in the ISO-13606 model - Folders, Sections, Entries, Clusters, Elements
3. Other sheets correspond to particular types of Composition - Views, Forms, Letters, etc

4. We are going to use the spreadsheet to add our own new form to the information model.

5. To do this, move to the Forms sheet and enter details of the new form on one of the blank lines (don't insert a new line, just use one of the existing blank lines - the sheet should be protected to prevent you from inserting or deleting lines).

6. In the column called Form Id enter an identity for your form - this must use only the characters a-zA-Z0-9 (i.e. no spaces or special characters, including dashes). The form will use the Display Name you enter in the second column - this is the title of the form and can contain any characters, including spaces and special characters. We will set our Form ID to Test Form and Display Name to Test Form so that it is easily identifiable in the interface.



Specialty - Feature Demo.ods Information Model

7. The Rank column determines the order in which your form will be listed, relative to the other forms already defined - enter a low number to see it near the top of the list or a high number to see it at the bottom

8. The fields that are buff coloured and headed Sections are where you can select the sections that will appear on your form-you pick these from the drop down lists in each field. Sections will appear on your form in the order in which they are listed here.

9. The sections in those drop down lists come from the Sections sheet. You can move there to see how sections are defined in a similar way to Forms. You can add a new section here and add Entries to it, in the same way that you added sections to a form.

10. In the Entries sheet you can add new entries, each with a list of elements as contents. Finally, you can defined elements on the Elements sheet, with their data types, including lists of enumerated values, if required.

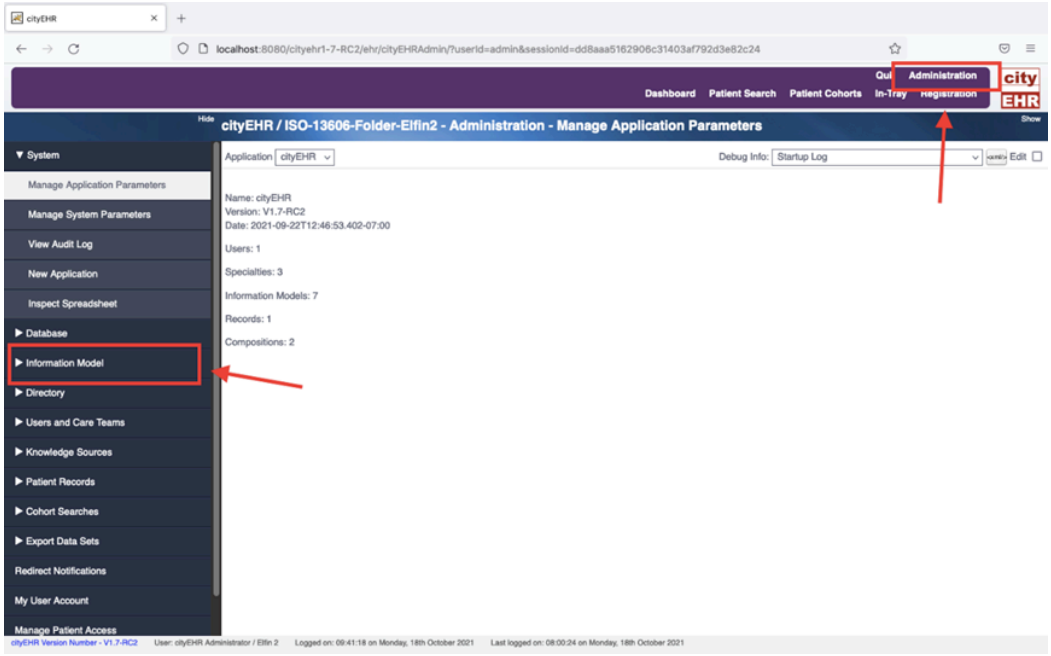
11. Once you are happy with your changes save the spreadsheet under a new name (its important to do this in case you have made a mistake and need to revert to the previous version).

    Note: skip the next steps if you are instructed by your workshop organiser to load models directly as a spreadsheet file.

12. Having saved the new spreadsheet you now need to save it again, but this time in XML format. To do that use Save As and select in the File type dialogue at the bottom of the screen for Microsoft Excel 2003 XML (.XML) - note that this option may be scrolled off the bottom of the list of file types when you first select the list.

13. The save as XML will take about 30 seconds. Once successfully saved, make sure you close the spreadsheet since it is now in XML format and any additional changes you make to it will not be properly recorded in the spreadsheet. (to make further edits, reopen the .ods file and re-save as XML when you are done).

14. Back in the cityEHR interface, navigate to the Admin page and select Import Information Model from the list of selections on the left.



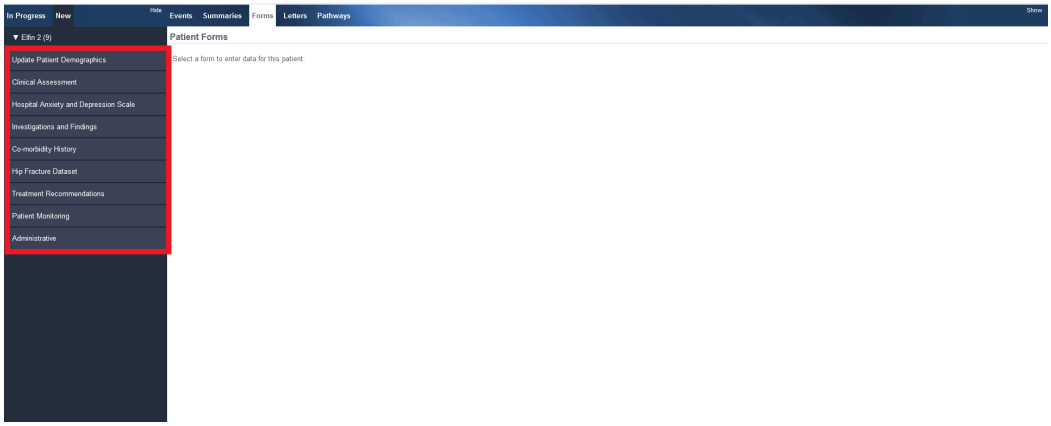
Navigating to the Information Model page

15. Browse to the information model spreadsheet you have just created and press to open it. The file will now be 'uploaded' to the cityEHR server. Once that has completed, an Import button will appear on the right of the display screen.

16. Press the import button and wait for the model to import to the database. This may take between 20 seconds and a couple of minutes, depending on the power of your machine.

17. Once completed, you will see a summary of all the processing that has been made, including lists of an errors found in your model.

18. If the model loaded successfully you can now navigate to the Patient Search page, find a patient, select Forms and you should see your new form available in the list of forms to create.



Forms page displaying new form

Configuring a Runtime Application

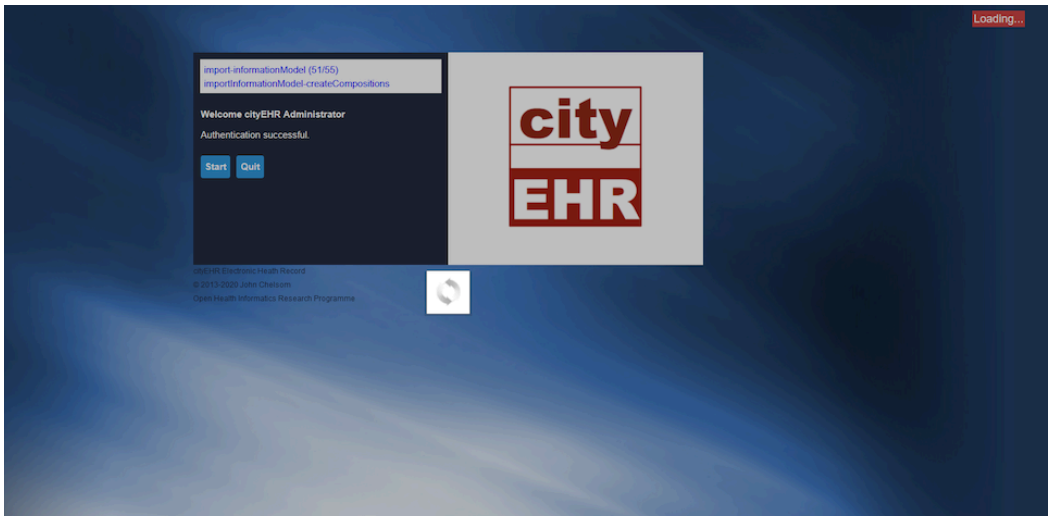
There are two types of applications you can create. You can either create a new one from scratch, or one that is shipped with cityEHR (like Elfin, Elfin2, or Ponseti). Instructions for making a New Application can be found in Section 13.1, and instructions for making an application that is shipped can be found in Section 13.2

Creating Your Own cityEHR Application – New Application

These instructions assume you are making an application with the identifier myEHR. Note that this identifier can contain upper/lower case characters and digits but no spaces.

1. Navigate to cityEHR Log-in Page

2. Enter user credentials. If you are starting from a blank database, the admin page will take a while to load. For this initial log-on, you will have to authenticate with username: user and password: password. This log-on may take some time as the system builds the application. Your screen may look like this:

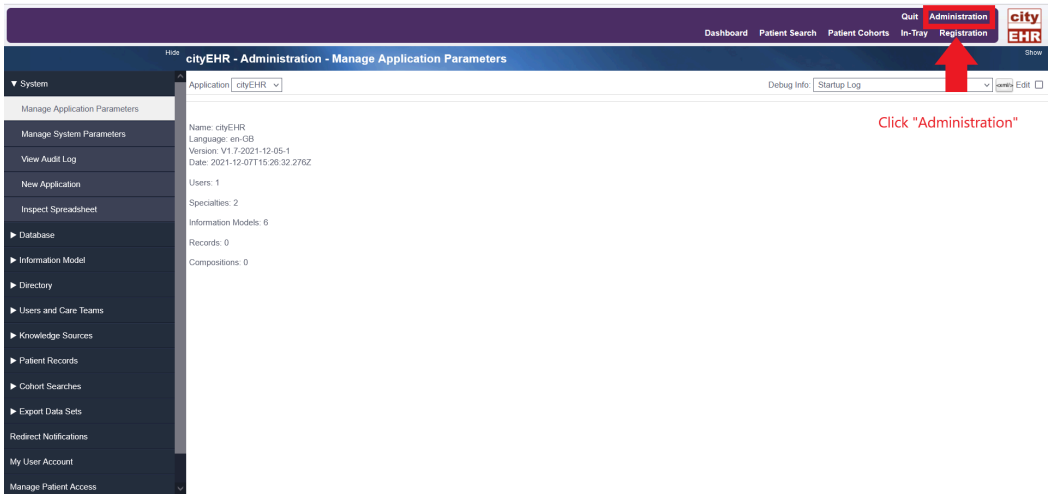


cityEHR log on page loading

3. Click "Start"

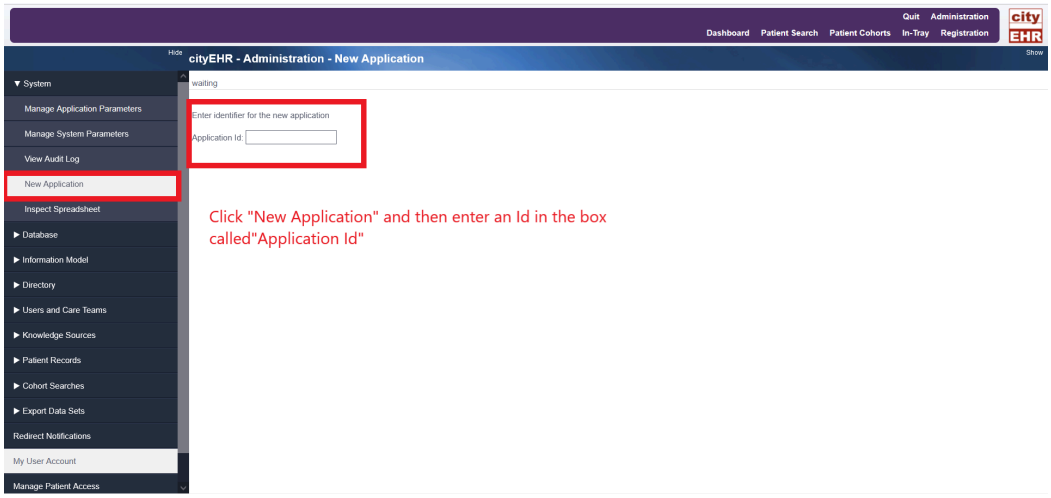
cityEHR log on page start up button

4. Navigate to the Administration Page at the top right of the screen next to “Quit”. Click “Administration”.



Primary Administrative page

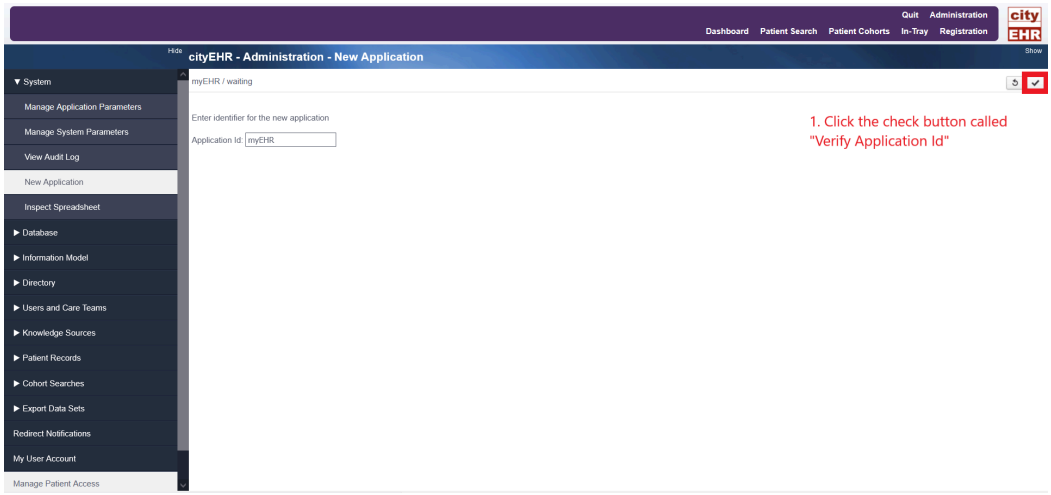
5. Now navigate to and click on “New Application” in the menu left of the screen. See below.



New Application page within Administration

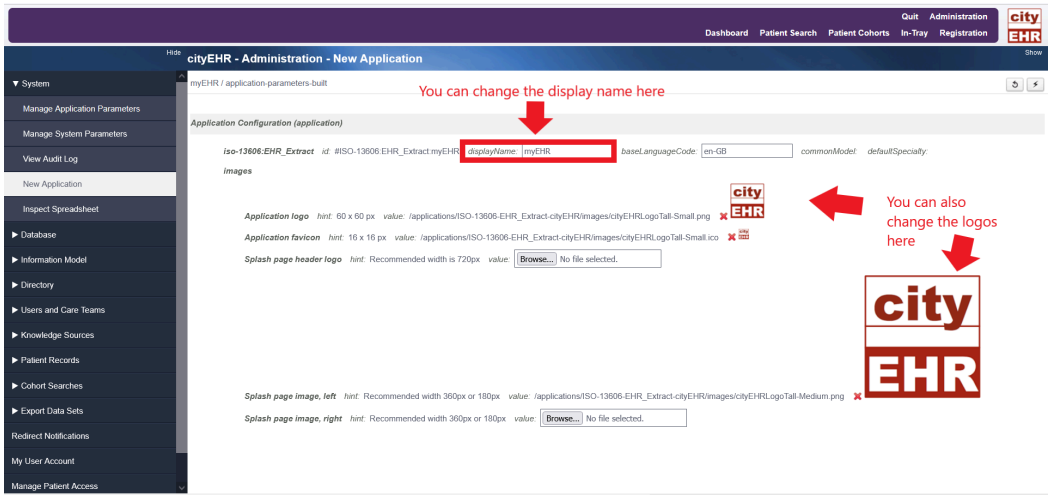
6. Now enter an Application Id. For this exercise, we will name the Application Id “myEHR”. Ids can be made up of upper and lower case characters a-z, digits 0 to 9, and dashes (-) or underscores (_). There cannot be spaces in the Id. Some installation Ids have configurations shipped with the cityEHR installation and if you pick one of those Ids it will install that configuration for you. if you pick a new Id, then it starts from scratch. myEHR will be our new Id for this exercise.

7. Now click the button that has a check mark to verify your application Id.



Verifying the Application ID

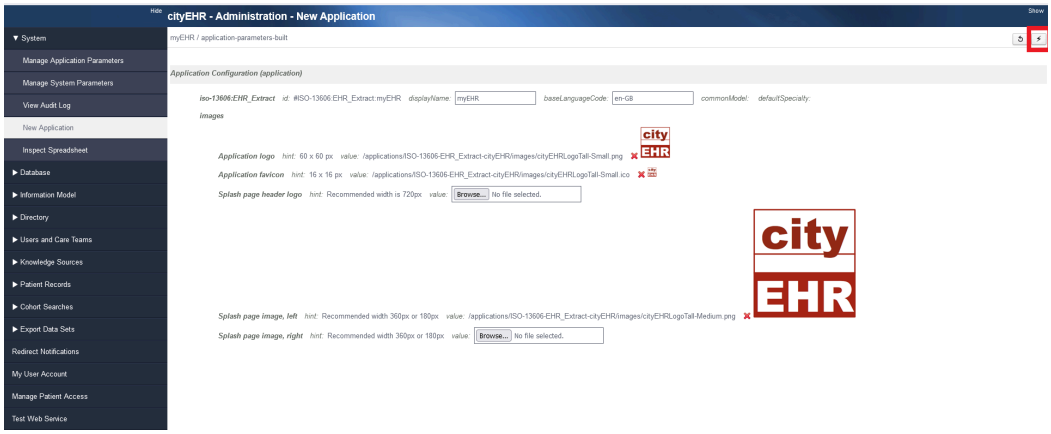
8. If this ID has never been used before, your screen will look like this:



New application configuration

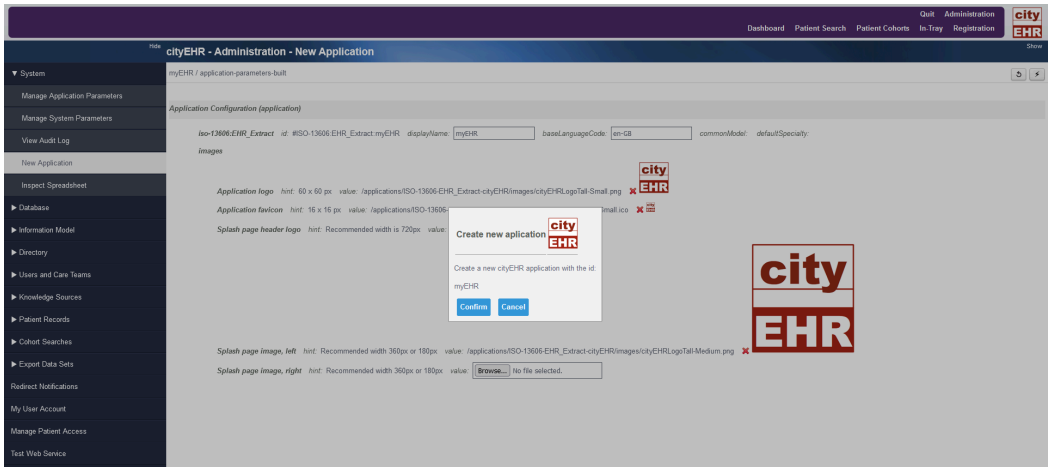
9. You can change the display name of your new application and change the logos.

10. Once you are finished changing the display name and logos (if you want), you can now click on “Create New Application ID” identified by the lighting bolt. See image below.



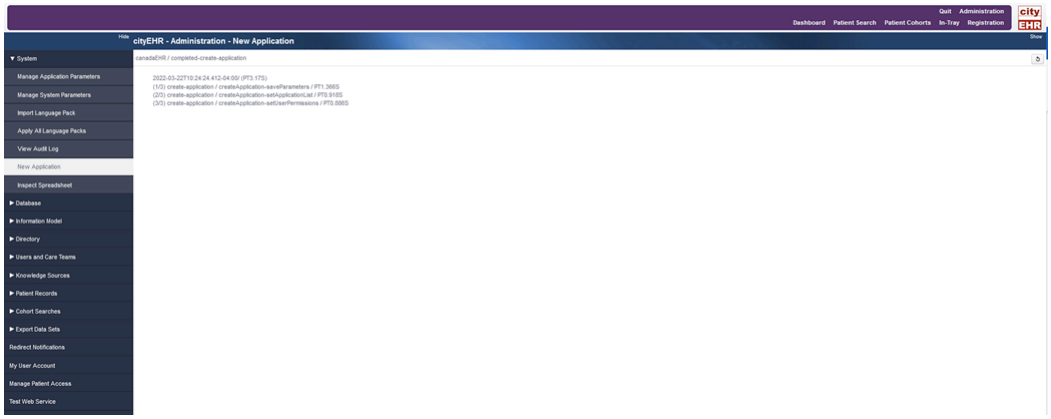
Creating a new application ID

11. A Dialogue Box will appear. Click Confirm.



Dialogue box to create new application

12. cityEHR will now create your new application. This may take a few moments. Your screen should now look like this, with three completed steps:



Page displayed when new application is created

13. Once cityEHR has finished creating your application, navigate to “Quit” in the Purple Dashboard.

14. On the log-in page, you should now be able to select your new application in the drop-down menu.

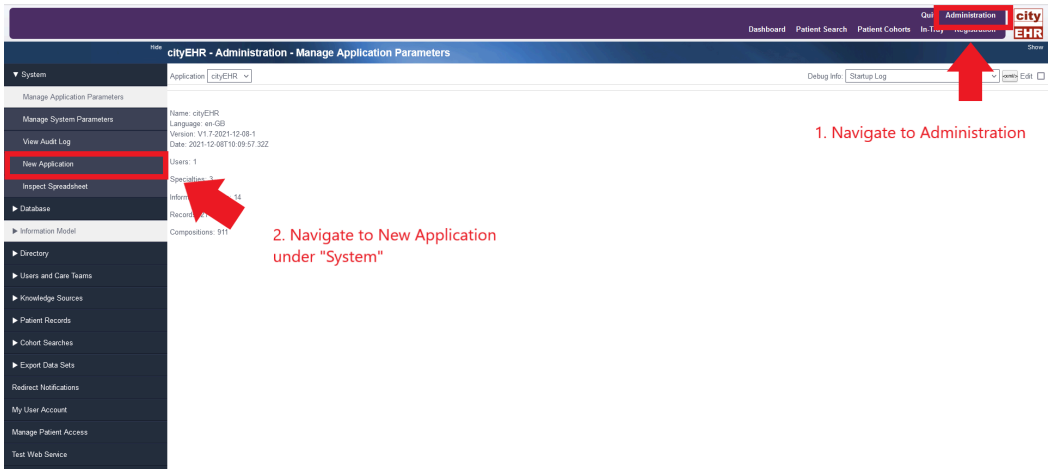
Selecting alternative application on cityEHR log on page

15. your application will be “empty” until you create, configure, and import an information model for your application. Navigate to section 13 called “Manipulating an Information Model” for instructions on how to do this.

Creating a Shipped Application

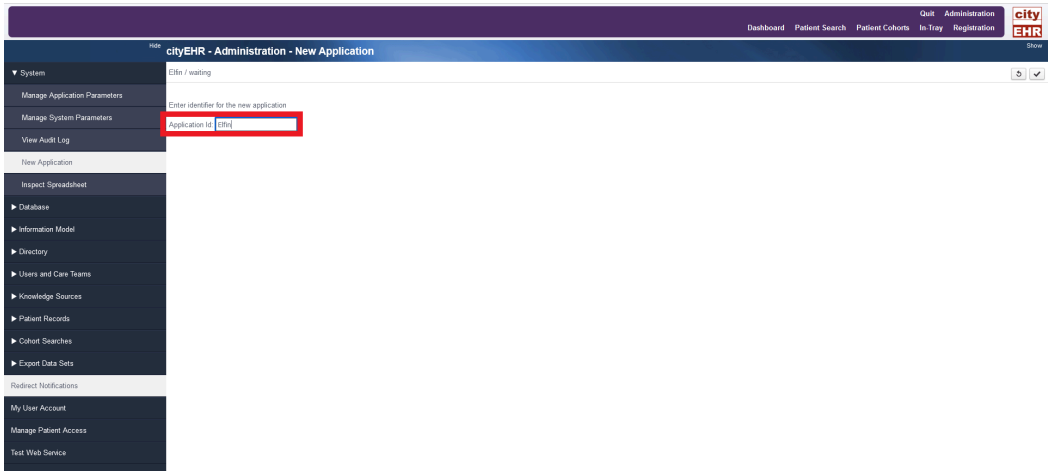
This section will teach you how to create an application that ships with cityEHR, such as Elfin or Elfin2. For this example, we will create an application with the id Elfin.

1. Navigate to Administration page and then to “New Application” under “System” in the menu on the left of the screen.



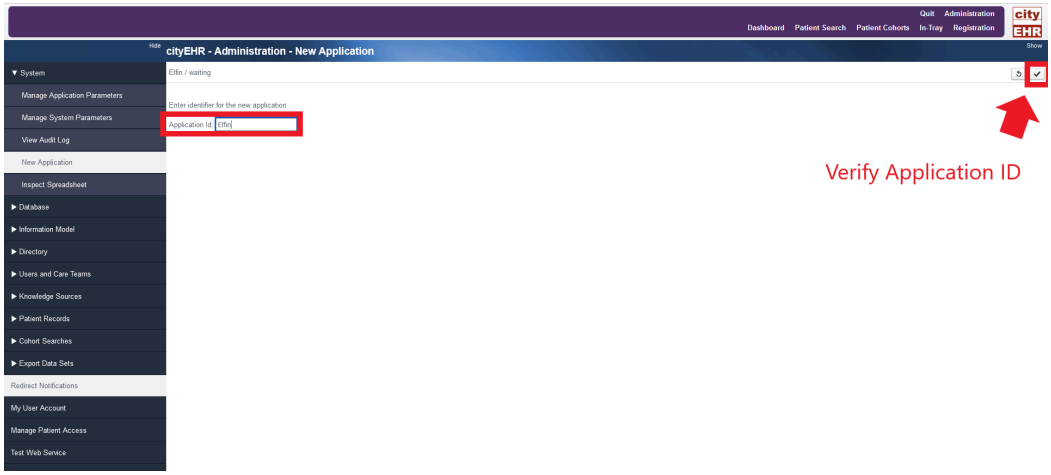
Navigating to New Application in Administration

2. Enter the shipped application id “Elfin” or “Elfin2” or “Ponseti”. For this exercise, enter the application ID “Elfin2”.



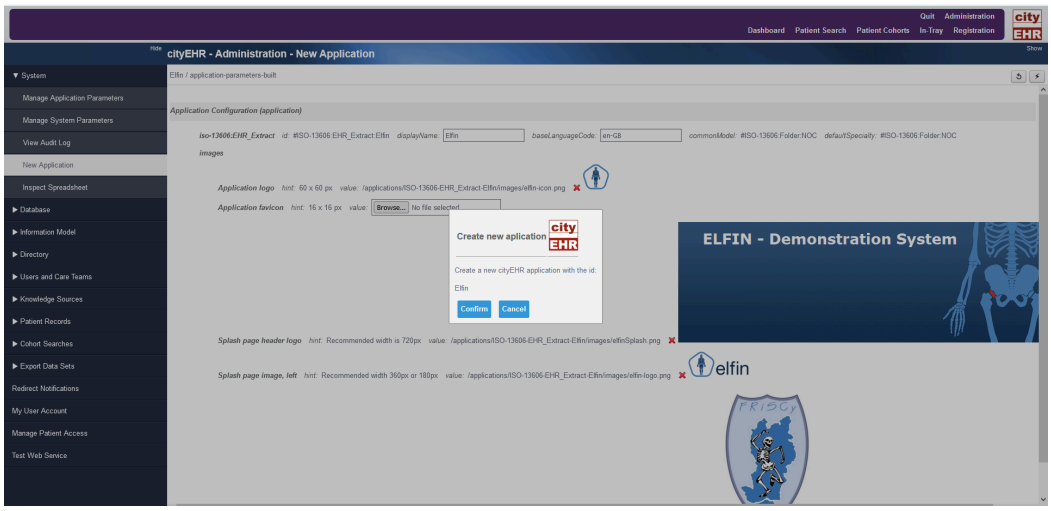
Entering the shipped application name "Elfin2"

3. Click “Verify Application Id” (the check mark icon) in the top right of the display screen.



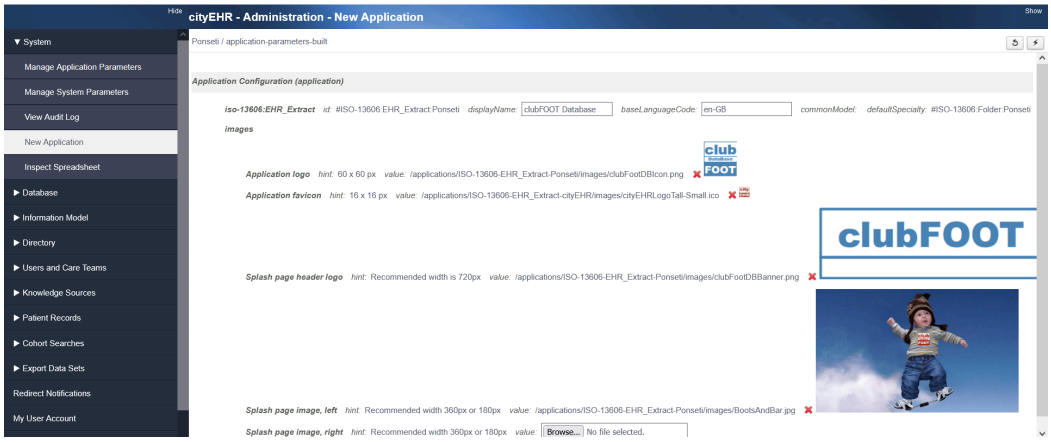
Verifying the new application "Efin2"

4. Your screen should now look like the one below if you have typed in Elfin2.



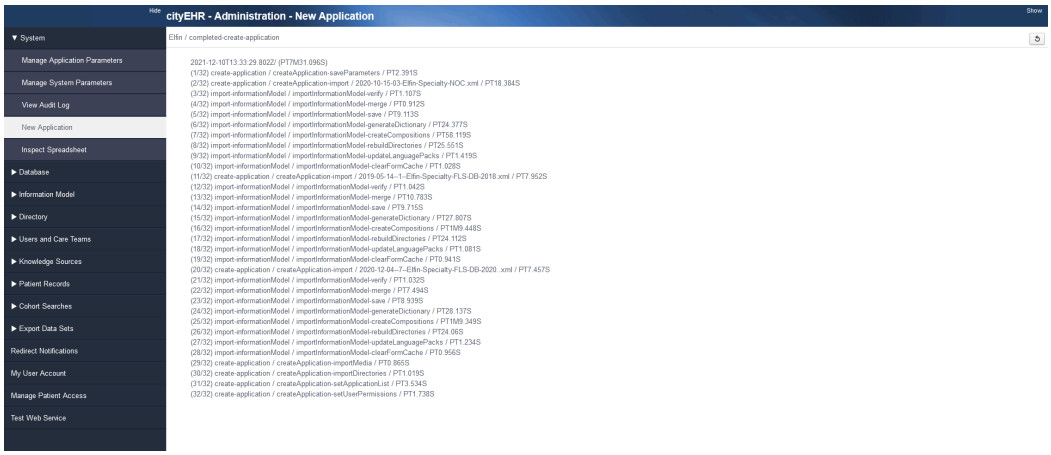
Configuration page and dialogue box for Elfin

5. If you have typed in “Ponseti” as the application ID, your screen will look like the one below.



Shipped application, Ponseti configuration page

6. These are two applications that ship with cityEHR that can be created in your local database.



Page displayed when new application (Elfin) is created

7. Now click “Create New Application” (lightning bolt icon) and wait for it to load. This may take a few minutes.

8. Once it has finished creating, navigate to Quit in the Purple Dashboard

9. You should now be able to select “Elfin 2” as an application from the log-in page

10. Click Start and you will be navigated to the start-up home page for Elfin2.

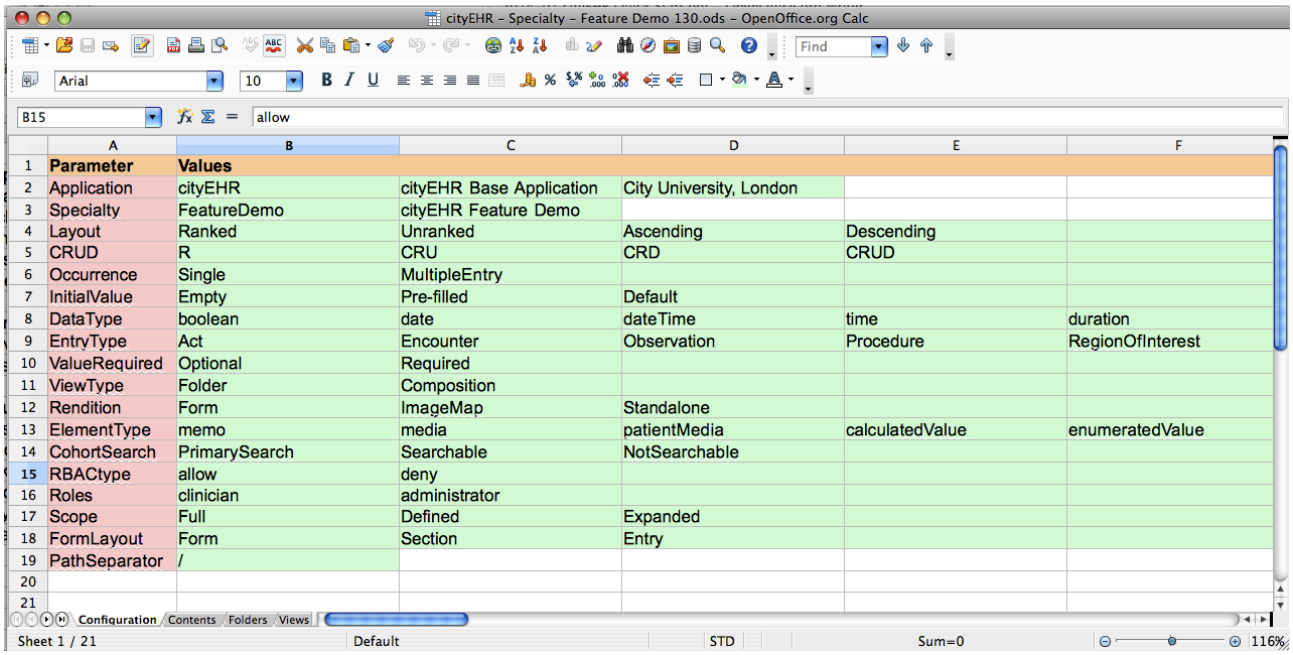
Creating an Information Model

Creating and Configuring the Information Model

The information model for your EHR application can be created in a spreadsheet by copying the model for the default cityEHR application that is found in the files:

- cityEHR - Specialty - Feature Demo
- cityEHR - Class - Diagnosis
- cityEHR - Class - Drugs
- cityEHR - Class - LabTest

All four spreadsheets have a Configuration sheet at the front which looks as follows:



	A	B	C	D	E	F
1	**Parameter**	**Values**				
2	Application	cityEHR	cityEHR Base Application	City University, London		
3	Specialty	FeatureDemo	cityEHR Feature Demo			
4	Layout	Ranked	Unranked	Ascending	Descending	
5	CRUD	R	CRU	CRD	CRUD	
6	Occurrence	Single	MultipleEntry			
7	InitialValue	Empty	Pre-filled	Default		
8	DataType	boolean	date	dateTime	time	duration
9	EntryType	Act	Encounter	Observation	Procedure	RegionOfInterest
10	ValueRequired	Optional	Required			
11	ViewType	Folder	Composition			
12	Rendition	Form	ImageMap	Standalone		
13	ElementType	memo	media	patientMedia	calculatedValue	enumeratedValue
14	CohortSearch	PrimarySearch	Searchable	NotSearchable		
15	RBACtype	allow	deny			
16	Roles	clinician	administrator			
17	Scope	Full	Defined	Expanded		
18	FormLayout	Form	Section	Entry		
19	PathSeparator	/				
20						
21						

Configuration page of information models

1. To begin doing this, open the cityEHR webapps folder
2. 2. Navigate to the following folder: *webapps/cityehr/WEB-inf/resources/apps/ehr/resources/applications/ISO-13606-EHR-Extract-cityEHR/informationModel*

Folder path of information models

You should land on the page above

3. Open the file named: Open the file named cityEHR-Specialty-**CommonModel**.

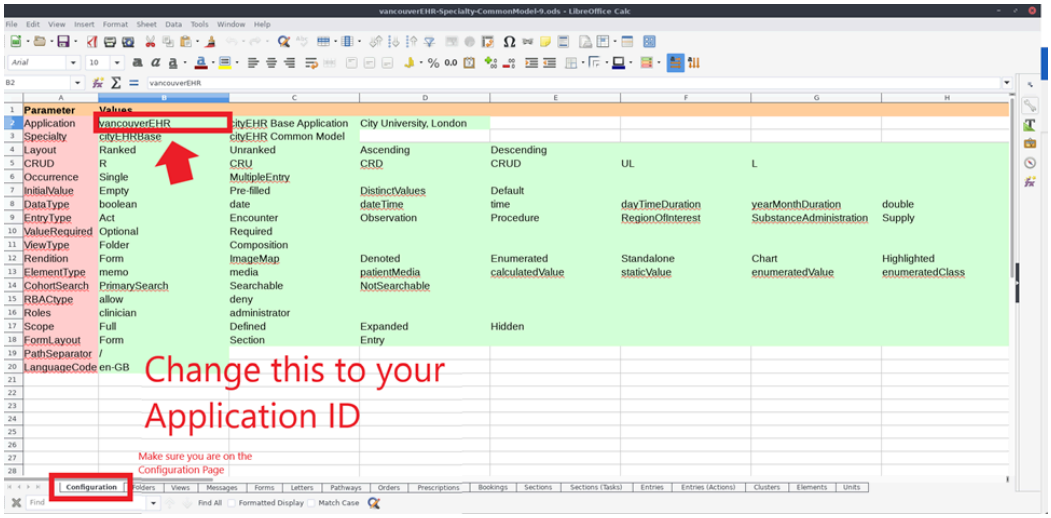
4. Go to File # Save a Copy # Rename it to your applicationId-CommonModel

5. Save your copy somewhere convenient.

6. **Close the original cityEHR-Specialty-CommonModel**

7. Open the copy you have saved at the location you saved it in.

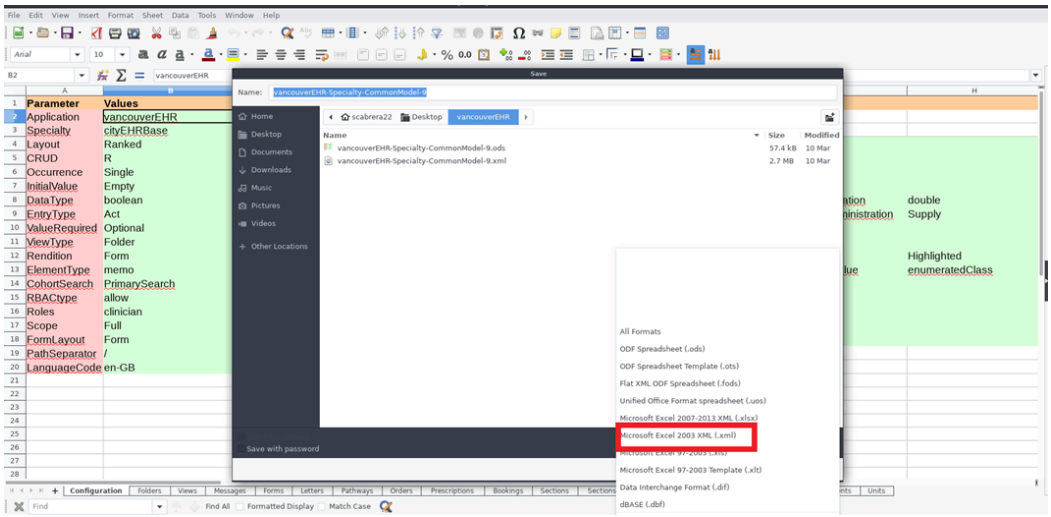
8. Change the ApplicationId on the Configuration page to exactly match the ApplicationId you assigned your new application. This is found on Line 2, Cell B on the Configuration Sheet (1st sheet).



Changing the Application ID within the information model

9. Save your changes (File # Save)

10. Now, navigate to File ---> Save As --> keep the name the same --> change the format to .xml under “All Formats” in the bottom right of the pop-up window. See image below.



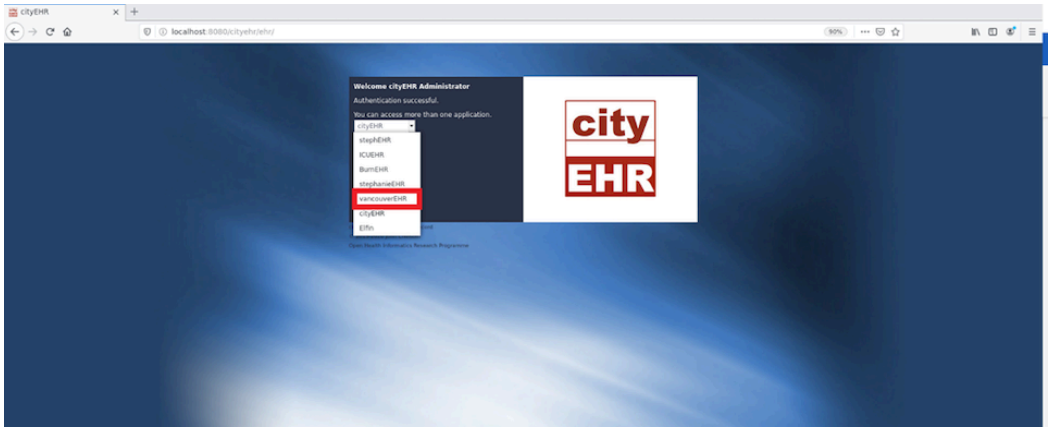
Saving the file as an XML

11. Close your windows

12. Open cityEHR back up.

13. Log-in using the same credentials

14. Now navigate to your EHR. This should be added in the drop-down under “You can access more than one application”



Selecting your application on cityEHR log on page

Click Start

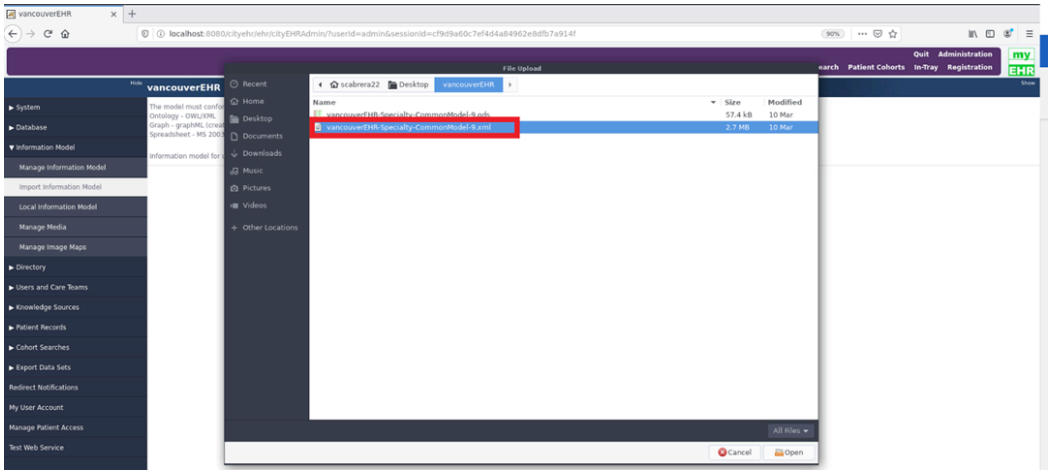
15. Navigate to Administration

16. Navigate to Information Model --> import information model on the menu on the left-side of the screen

17. Click Browse

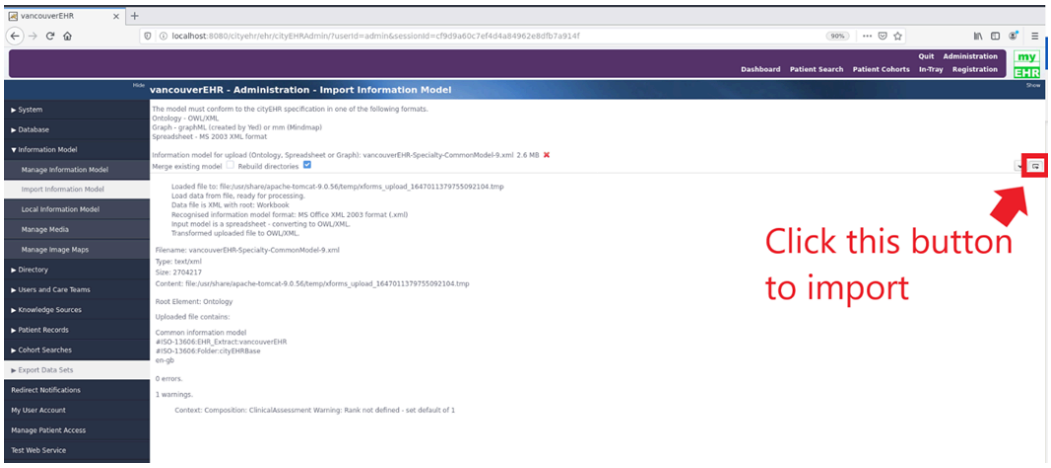
18. Find the .xml file you just saved. Note: It will not work if you don’t select the .xml file

19. Select the .xml file



Selecting new XML file for import

20. Import the information model using the icon at the top-right of the window. See image below.



Button to begin import of new information model

21. You should now land on a page that shows you the completion of 8 steps.

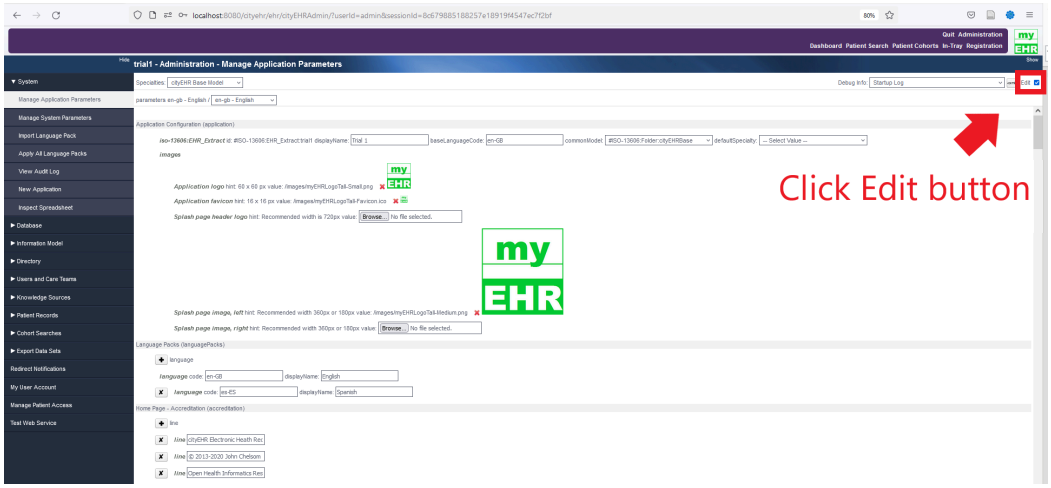
22. Navigate to Quit.

23. Log back into your application.

24. Navigate to Administration

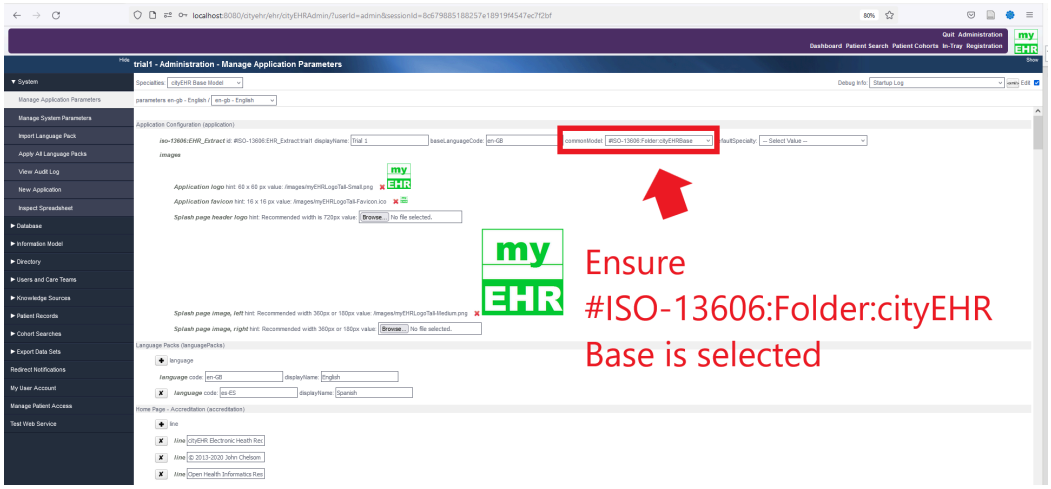
25. Navigate to Application Parameters found in the menu on the left-hand side of the screen.

26. Click “Edit”



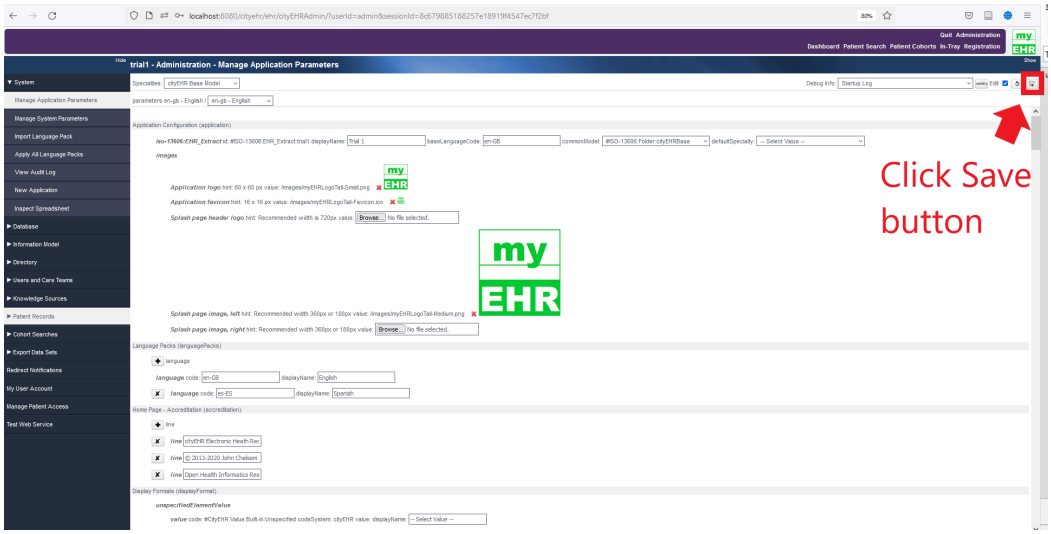
Editing Application parameters

27. Navigate to the “commonModel” option on the screen and ensure that the option #ISO-13606:Folder:cityEHRBase is selected (see below)



Selecting the cityEHR Base folder

28. Click Save and Navigate to Quit

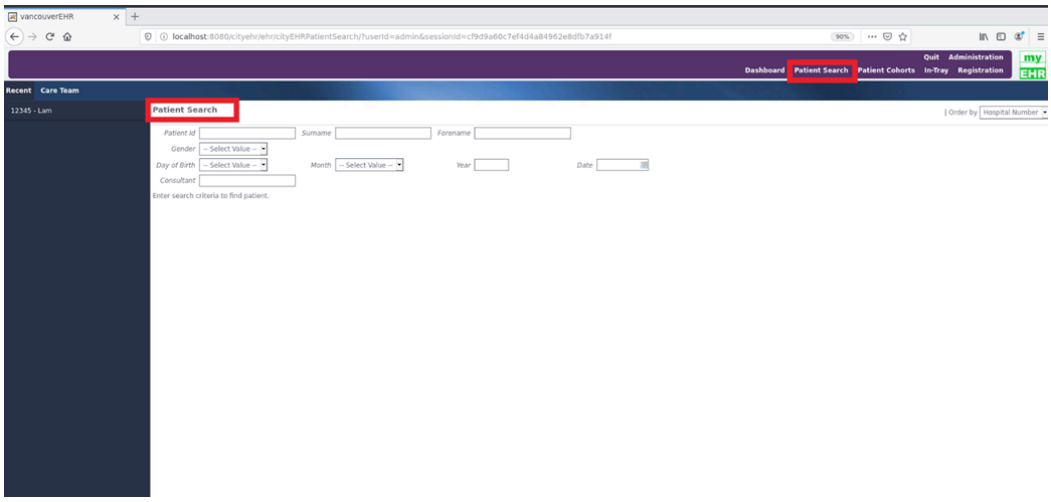


Saving Application Parameters

29. Log back into your application

30. Navigate to Patient Search and Registration in the top-right fo the screen on the purple dashboard

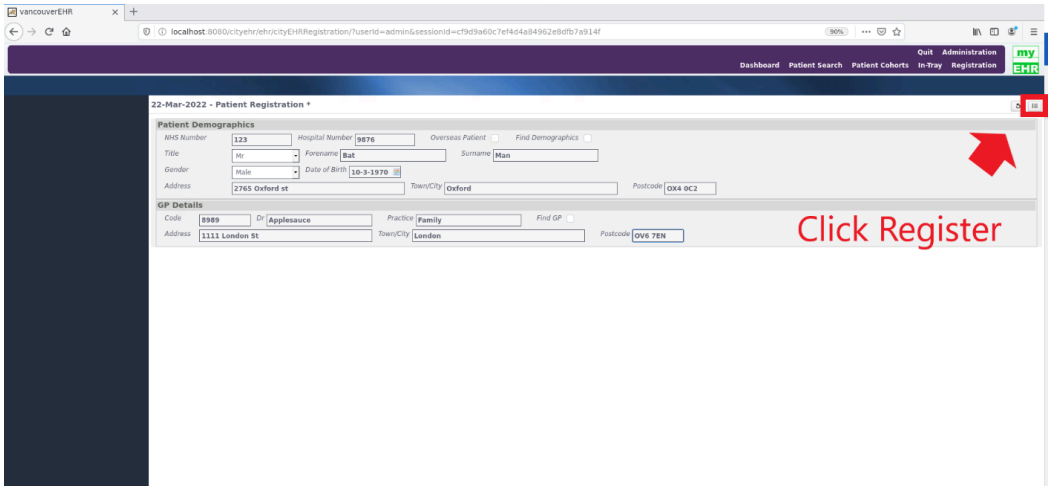
31. You should see a fully formed Patient Search Page and a Registration Page. See below:



Populated patient search page on your application

32. Navigate to Registration page

33. On the Registration page, register one patient. Click the menu button at the top right of the screen to finalize the registration.



populated patient registration page on your application

Congratulations! You have registered one patient and made your own base application.

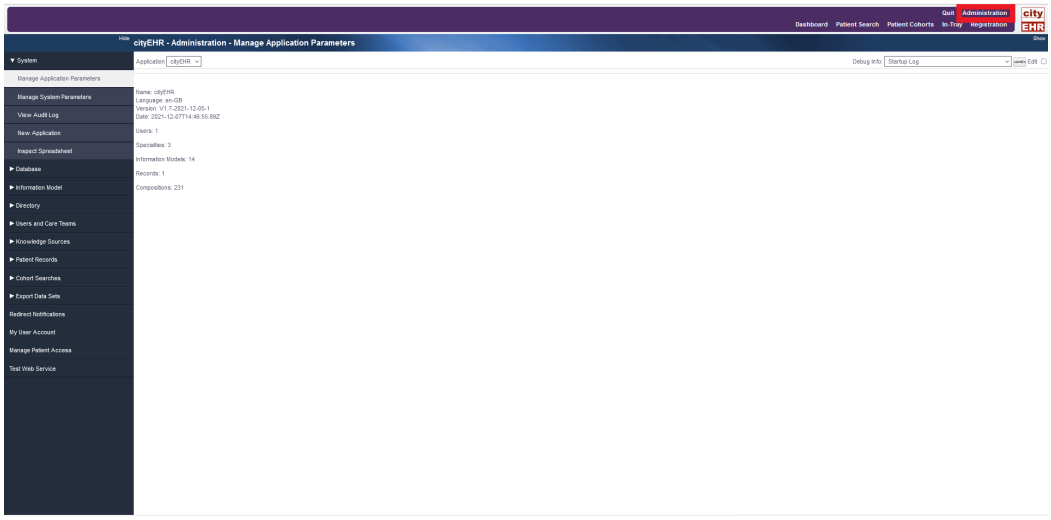
Activity complete! Quit cityEHR. If you would like to learn how to make changes to the spreadsheet to add Forms, Sections, Entries, Clusters, and Elements, please refer to the separate Information Modelling Guide.

Managing Information Directories

Element Directories

Directories are stored text that the user can edit. This section will show you how to access and edit element directories in cityEHR.

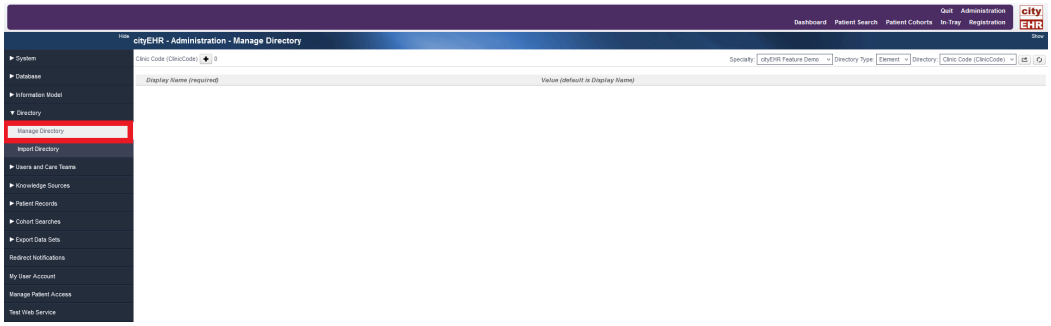
1. Navigate to the Admin screen of your chosen application. For this example, we will use Elfin 2.



Manage application parameters within administration

2. Navigate to the “Directory” menu on the left of the screen.

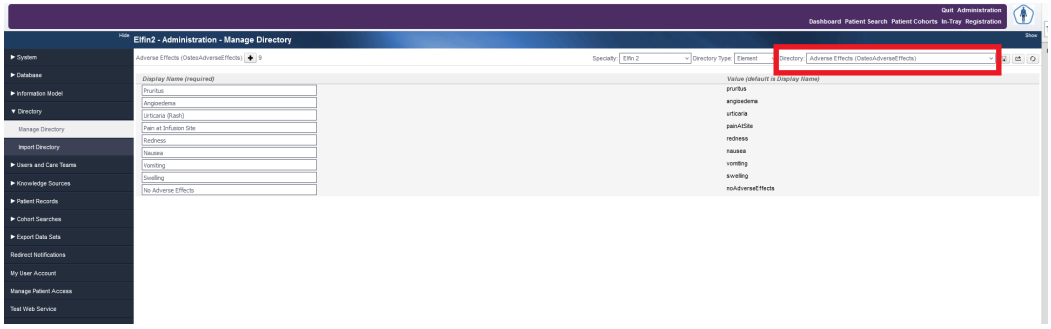
3. Click on “Manage Directory”



Manage Directory administration page

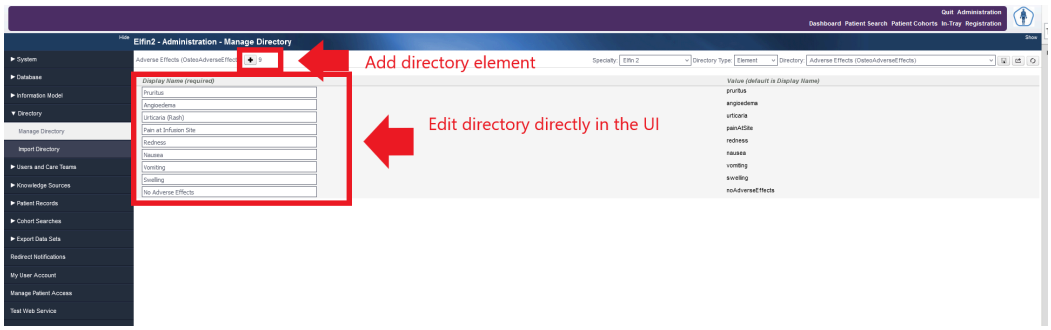
4. Ensure that the correct Speciality and Directory Type are selected. For this exercise, it should be set at Elfin2 and Element, respectively.

5. In the “Directory” dropdown list at the top right of the screen, select the directory you wish to edit or add to. For this example, we have selected “Adverse Effects” as our Element Directory.



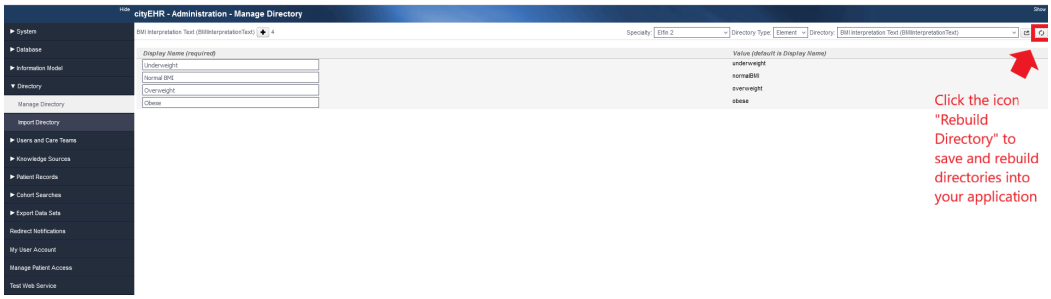
Selecting the desired directory from the dropdown list

6. You can add or edit this directory by clicking on the “+” sign at the top left of the directory or by editing the text boxes.



Editing the directory

7. Click the icon “Rebuild Directory” at the top left of the Manage Directory form to save and rebuild the directories into your application.

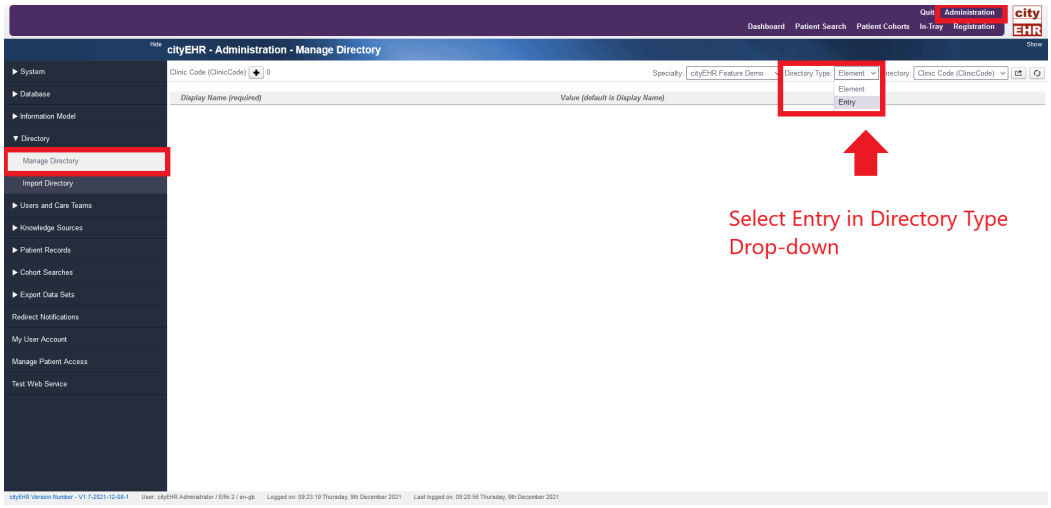


Rebuilding the directory

8. Navigate to the screen that contains this directory (form, letter, etc.) and view your changes

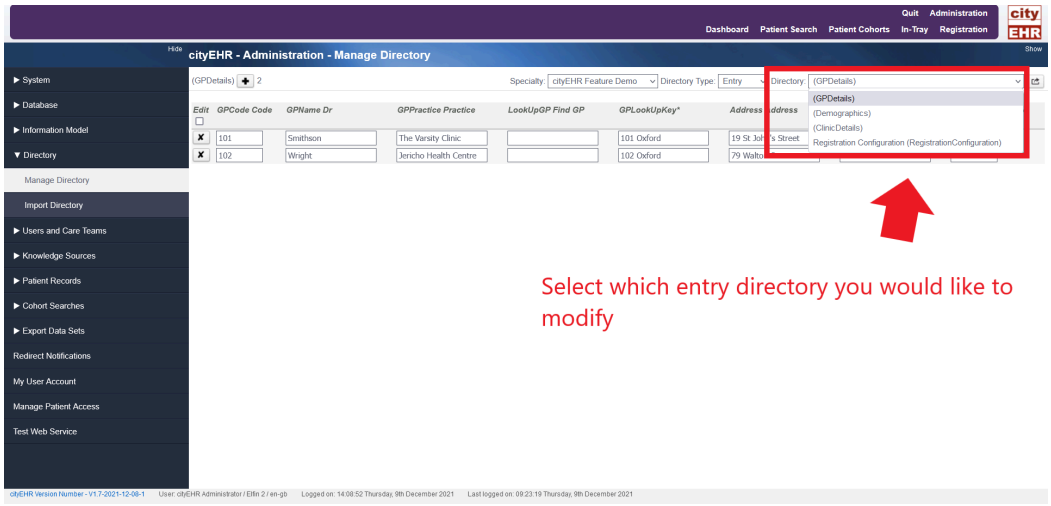
Entry Directories

1. Entry Directories work like Element Directories, but for Entries. You can edit Entry Directories the same way as Element Directories. To do this, navigate to Manage Directory and then Select “entry” in the Element Type drop down.



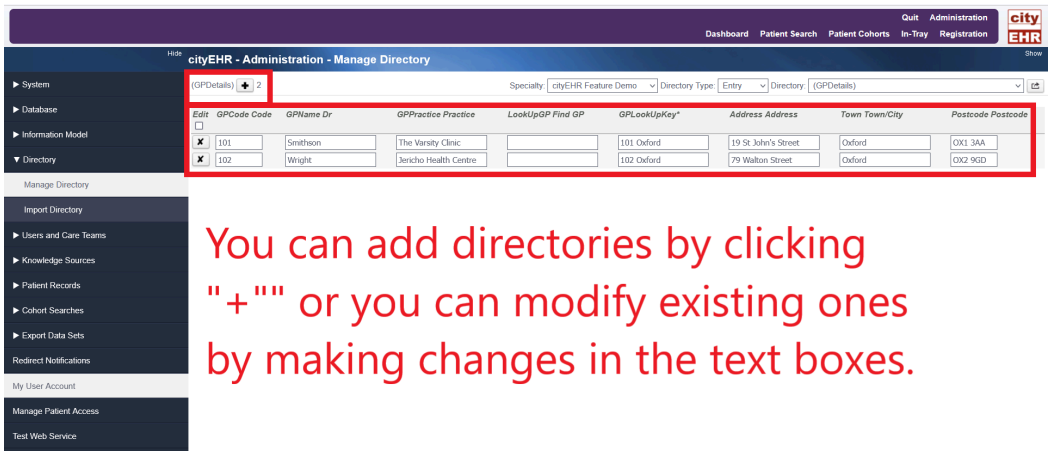
Selecting the type of directory

2. Select the Name of the Directory you want to modify.



Selecting the directory to modify

3. You can make changes in the existing directories or add new ones.

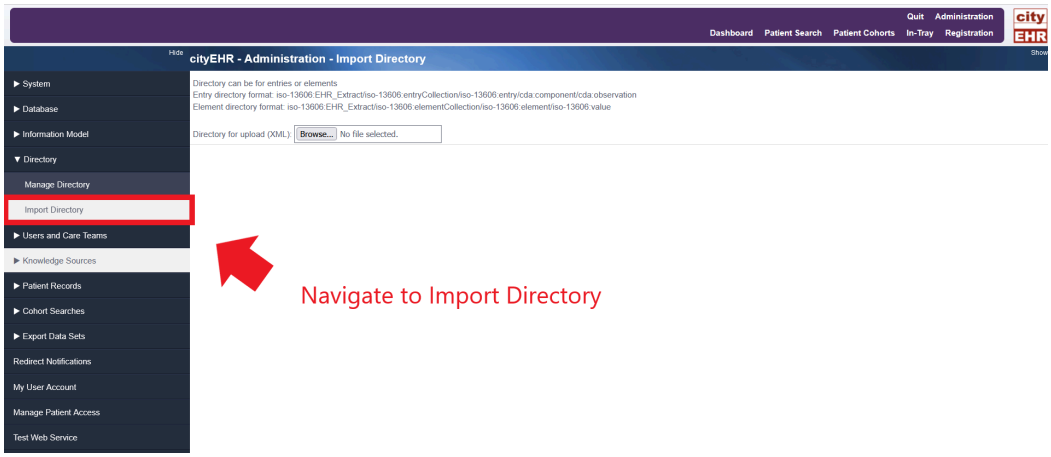


Adding directories or modifying existing ones

Importing Directories

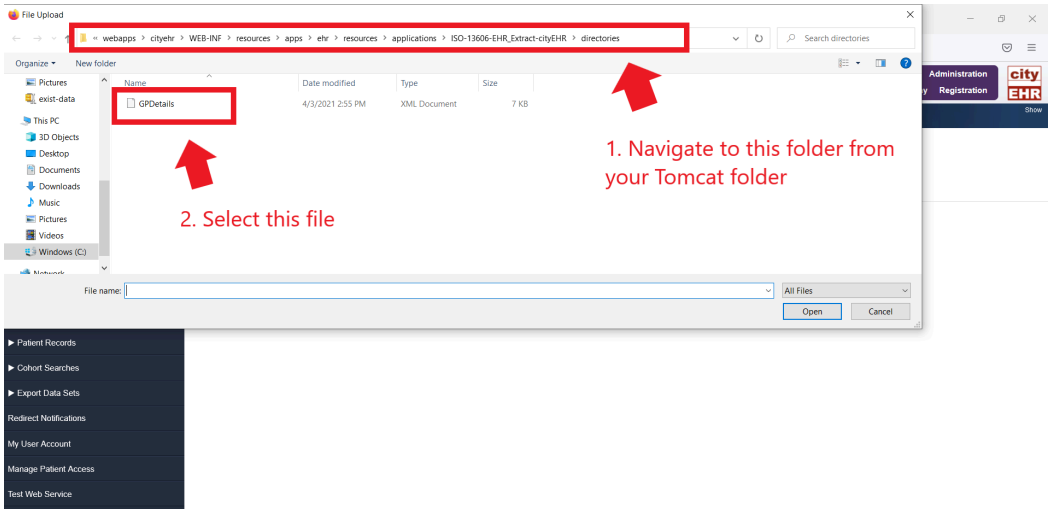
1. To import a directory, first navigate to the Administration page, and then to Directory in the menu on the left.

2. Now Navigate to “Import Directories” under “Directory”.



Import directory page

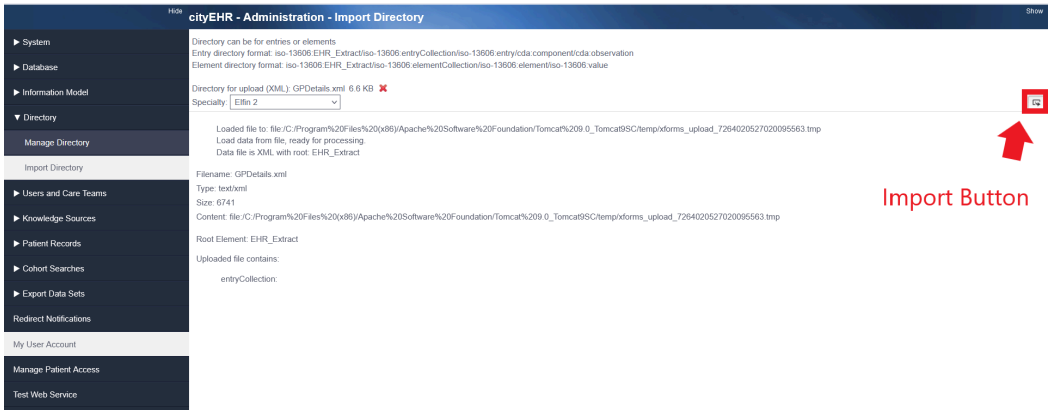
3. Click the “Browse” button in the display window and navigate to the folder shown in the image below.



Selecting GP details file for import

4. Select the file “GP Details”.

5. Click the import button.

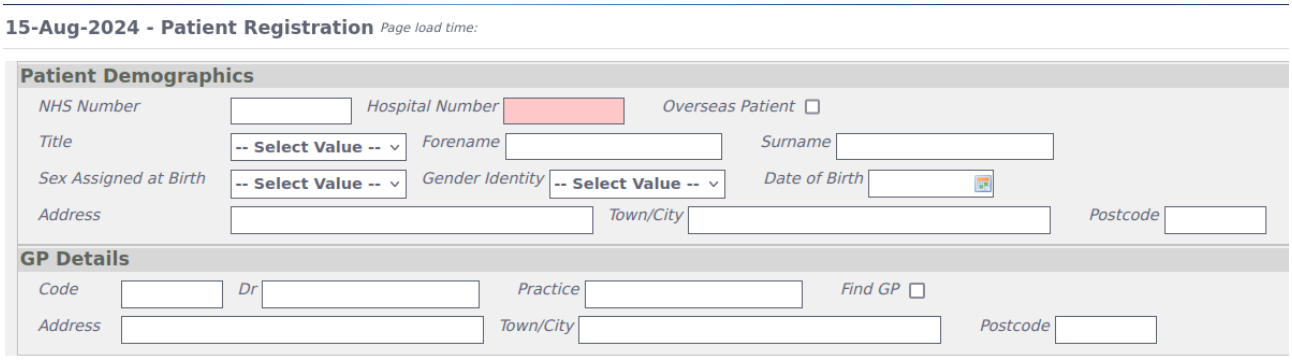


Importing the GP details file

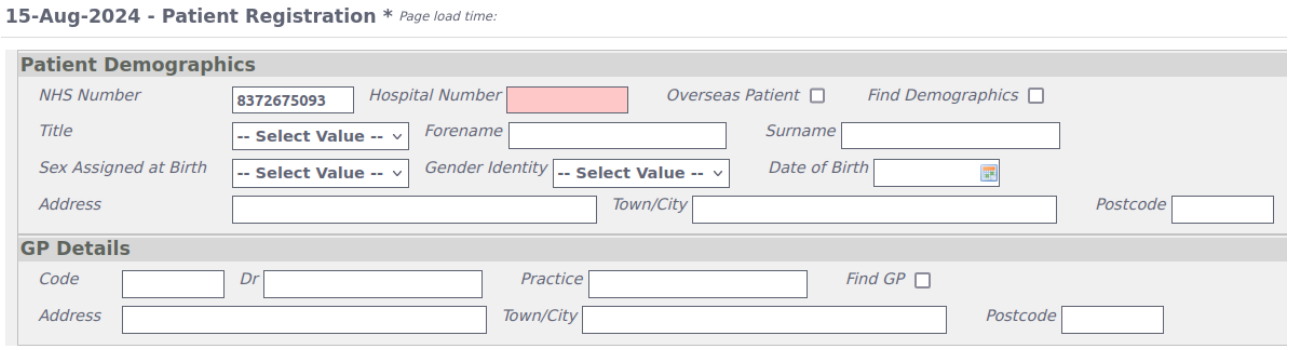
6. Now navigate to “Manage Directory” and navigate to your Entry Directories and you should be able to see “GP Details” as an option to edit!

Directory Look Up Using a Web Service

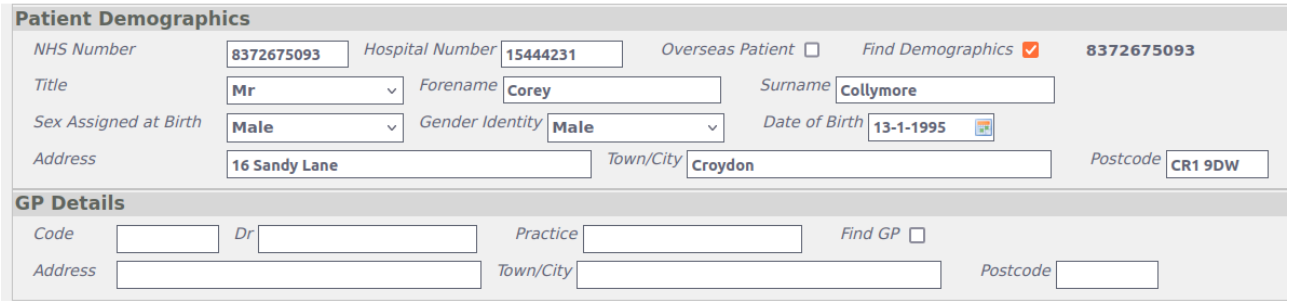
There is an example of a directory lookup using a web service on the Registration form in the Feature Demo information model that ships with cityEHR. The web service is a demonstration service that returns a randomly generated set of demographics data, given the patientId as an input parameter.



Empty patient registration form



NHS number filled in patient registration form



Lookup service used in patient registration form

Access Control - documentation coming soon!

cityEHR has a role-based access control system that can be configured to restrict user access to specific functions, based on the role of the user. In addition, users can be restricted so that they can access only the data of patients who are assigned to the care team(s) of which that user is a member.

Setting Up User Roles

Assigning Roles for a User

Role-based Access Control to Functions

Restricting Access to Care Team Patients

Care Pathways – documentation coming soon!

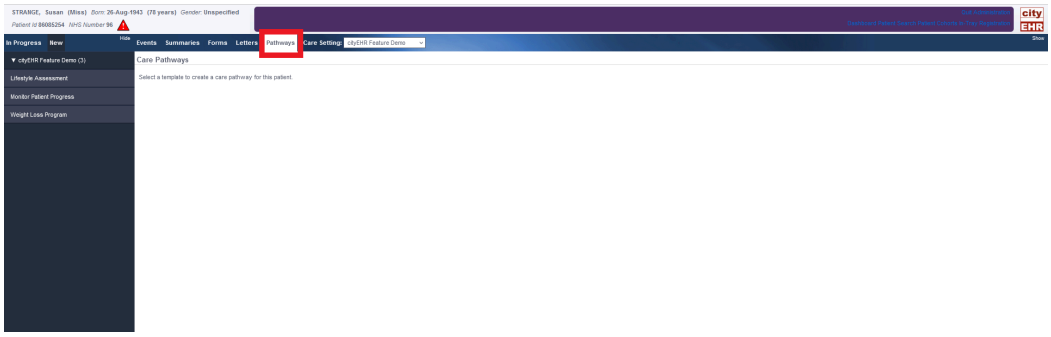
Health Lifestyle Pathway

1. To review the pathways functionality in cityEHR, we will navigate through the Healthy Lifestyle pathway in the cityEHR Feature Demo application.

2. Log-in to the cityEHR Feature Demo application.

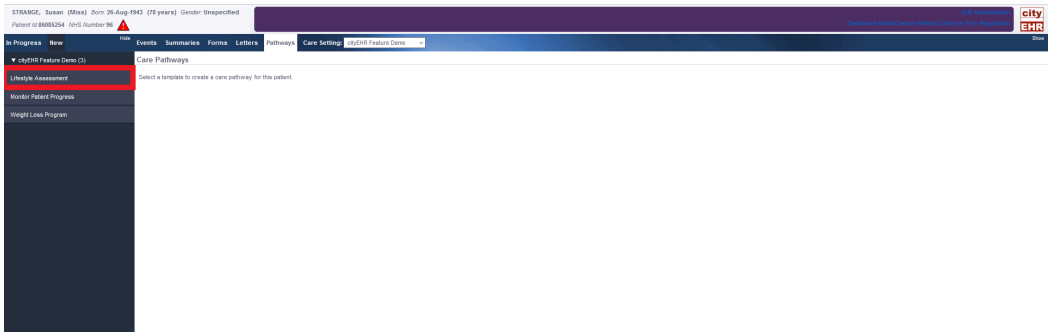
3. Navigate to Patient Search and select a patient.

4. Navigate to Pathways in the blue dashboard. See below.



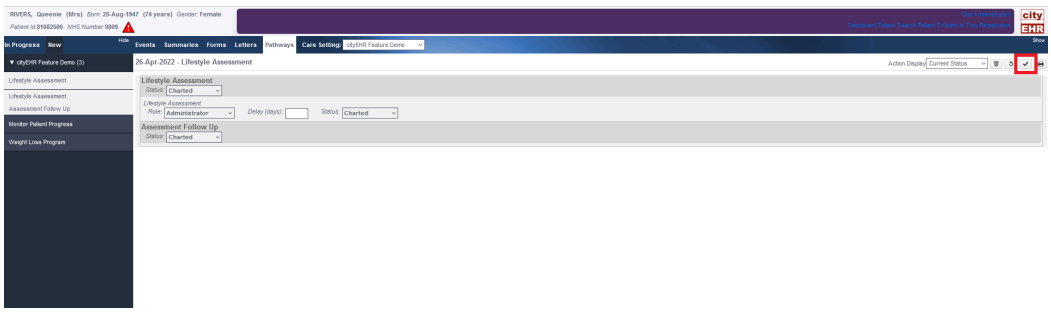
patient pathways page in cityEHR

5. In the menu on the left-hand side, navigate to the pathway called “Lifestyle Assessment”.



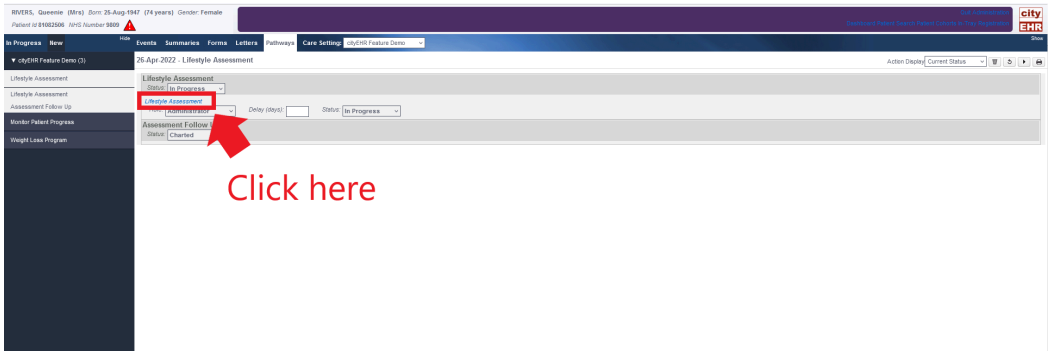
Lifestyle assessment pathway

6. Click the checkmark icon at the top-right of the screen below the blue and purple dashboards. See below.



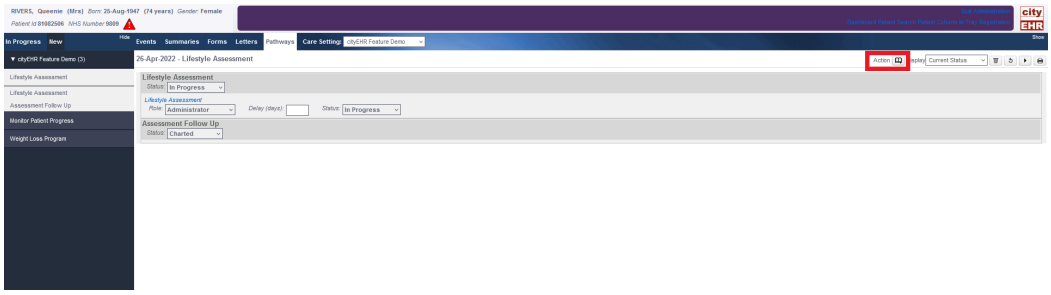
Starting the lifestyle assessment

7. Once clicking Start Pathway, you will notice that the italicized “Lifestyle Assessment” turns into a blue hyperlink. Click this.



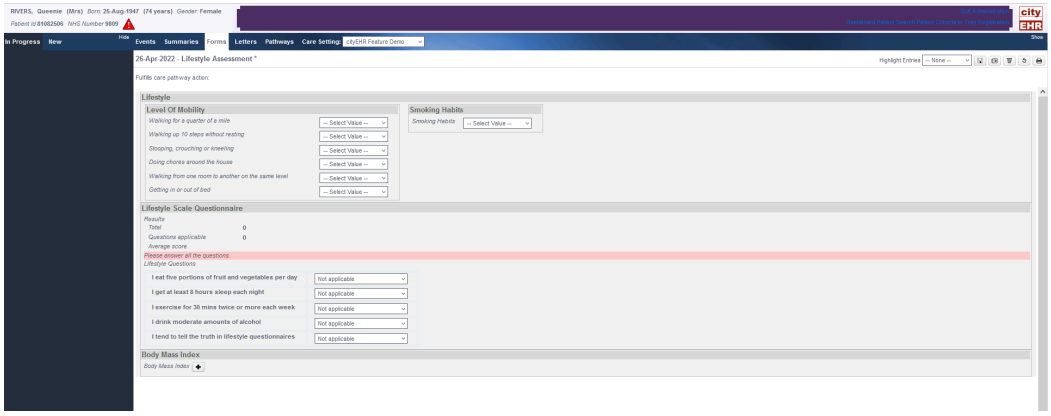
Lifestyle assessment hyperlink

8. Now click the “Action” button that appears at the top-right of the screen. The icon looks like an open book. See below.



Action button for Lifestyle assessment

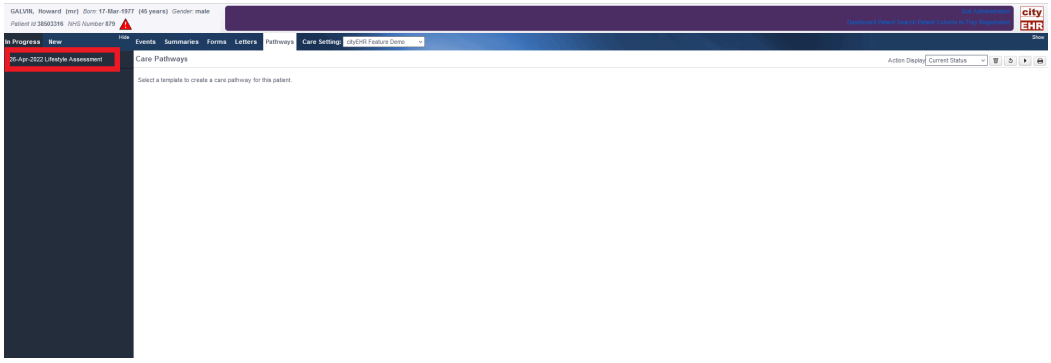
9. You should be navigated to a Lifestyle Assessment form. Fill out some values in this form.



Empty Lifestyle assessment

10. Click the Publish icon at the top-right of the screen and click Commit Form.

11. Your in-progress pathway will appear on the left-hand side of the screen. Click on it.



In progress lifestyle assessment

12. You should now see that the Lifestyle assessment section of your pathway has been completed. You can now click the icon called “Progress” to continue documenting in the section Assessment Follow Up.

Using Sub-Pathways

- one with sub pathways

Pathways with Repeating Loops

- one with repeating loops

--- a lifestyle assessment – takes BMI, if your BMI is > 30 --> diet and exercise plan

Clinical Correspondence

Creating a Letter Template

Letter templates are word processor documents (either LibreOffice or MS Office) which contain fields that reference Sections, Entries or Element components in the clinical information model. The template can then be associated with a Letter composition that contains those components, which are then extracted from the composition and used to instantiate the fields in the template.

The letter templates are created outside of cityEHR as any regular document using LibreOffice Write or MS Word. An example of a template is shown below.

The cityEHR Clinic

NHS Trust

#ISO-13606:Section:LetterHeadLeft	#ISO-13606:Section:LetterHeadRight
#ISO-13606:Section:LetterHeadTarget	#ISO-13606:Section:LetterHeadSupplement

#ISO-13606:Section:LetterHeadSubject

#ISO-13606:Entry:patientLetterIntroduction

	#ISO-13606:Entry:patientLetterMedicationAdvice/#ISO-13606:Element:patientLetterMedicationAdvice
	#ISO-13606:Entry:patientLetterCalciumAdvice/#ISO-13606:Element:patientLetterCalciumAdvice
	#ISO-13606:Entry:patientLetterVitamindAdvice/#ISO-13606:Element:patientLetterVitamindAdvice
	#ISO-13606:Entry:patientLetterExerciseAdvice/#ISO-13606:Element:patientLetterExerciseAdvice
	#ISO-13606:Entry:patientLetterSmokingAdvice/#ISO-13606:Element:patientLetterSmokingAdvice

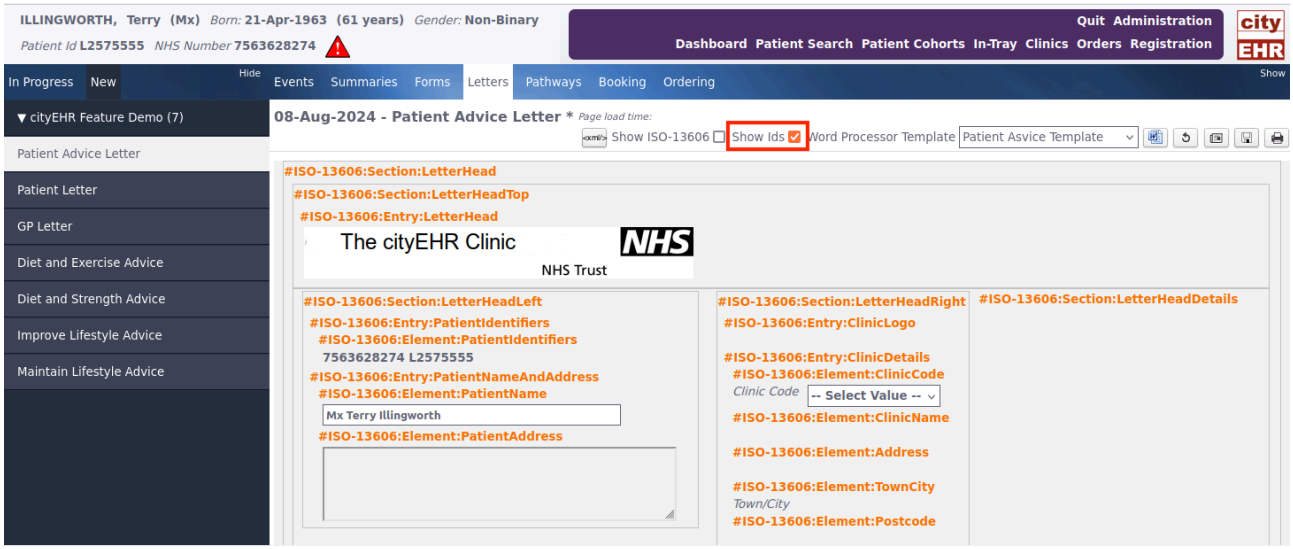
Page 1 of 2

Letter Template for Patient Advice using LibreOffice Writer

A Letter Template can contain any text and graphics, together with the fields which reference content in the patient record. The text for those fields is then pulled into the template from the Letter in cityEHR with which the template is associated.

#ISO-13606:Section:sectionId	The values of all Elements for all Entries in the specified Section
#ISO-13606:Entry:entryId	The values of all Elements in the specified Entry
#ISO-13606:Entry:entryId/ #ISO-13606:Element:elementId	The value of the specified Element

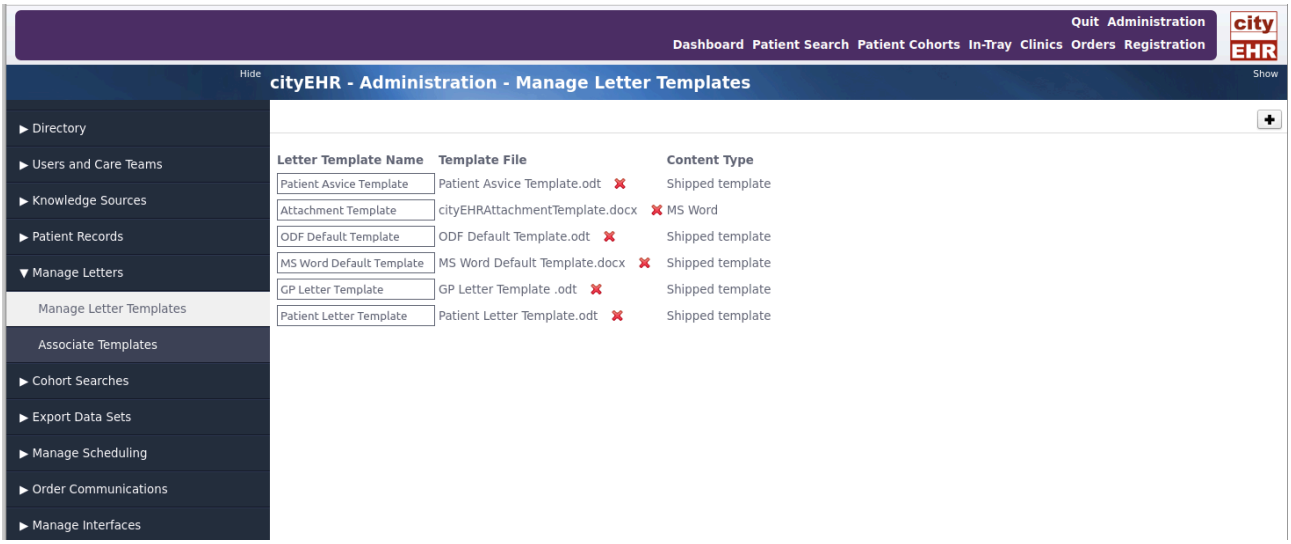
Note that the components with the referenced identifiers must be present in the Letter with which the template is associated – if not, then the referenced field will be blank. When developing templates you can find the identifiers to use by accessing a Letter in cityEHR running in debugging mode. Click the checkbox to Show Ids and the identifiers for each component will be displayed.



Show Ids When Running cityEHR in Debugging Mode

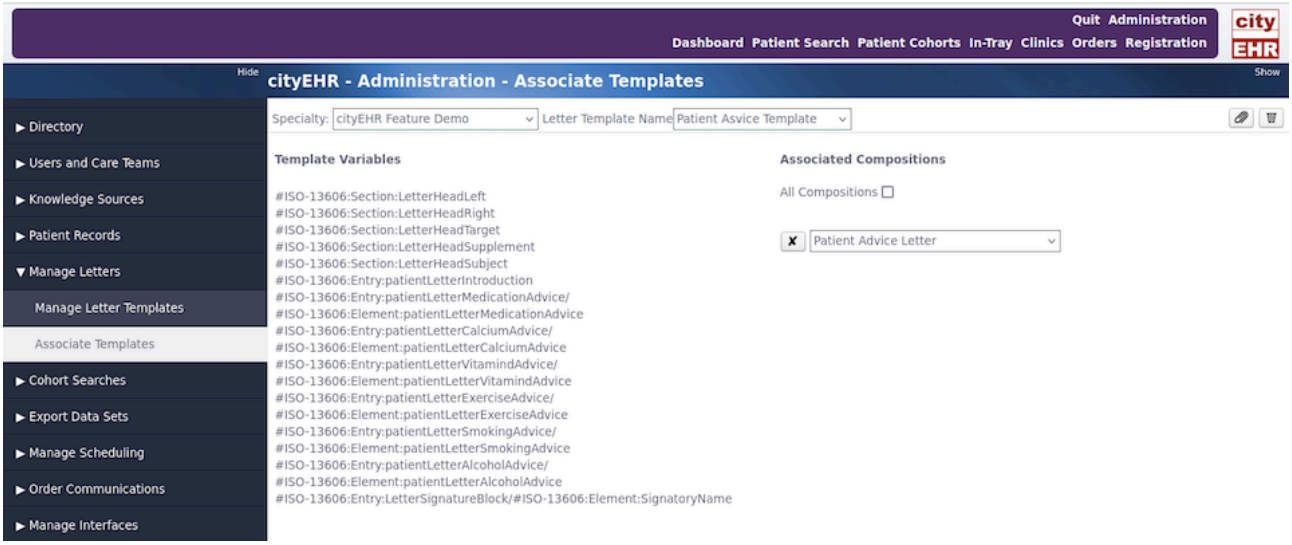
Importing and Associating a Template

Letter Templates can be imported from the Administration page by selecting the option for Manage Letters | Manage Letter Templates. This page lists all currently loaded templates and you can add a new one by pressing the + button in the top right menu and then browsing to the file location of the word processor document you with to import. Pressing the red X button next to any existing template in the list allows you to change (re-import) the associated word processor file.



Letter templates

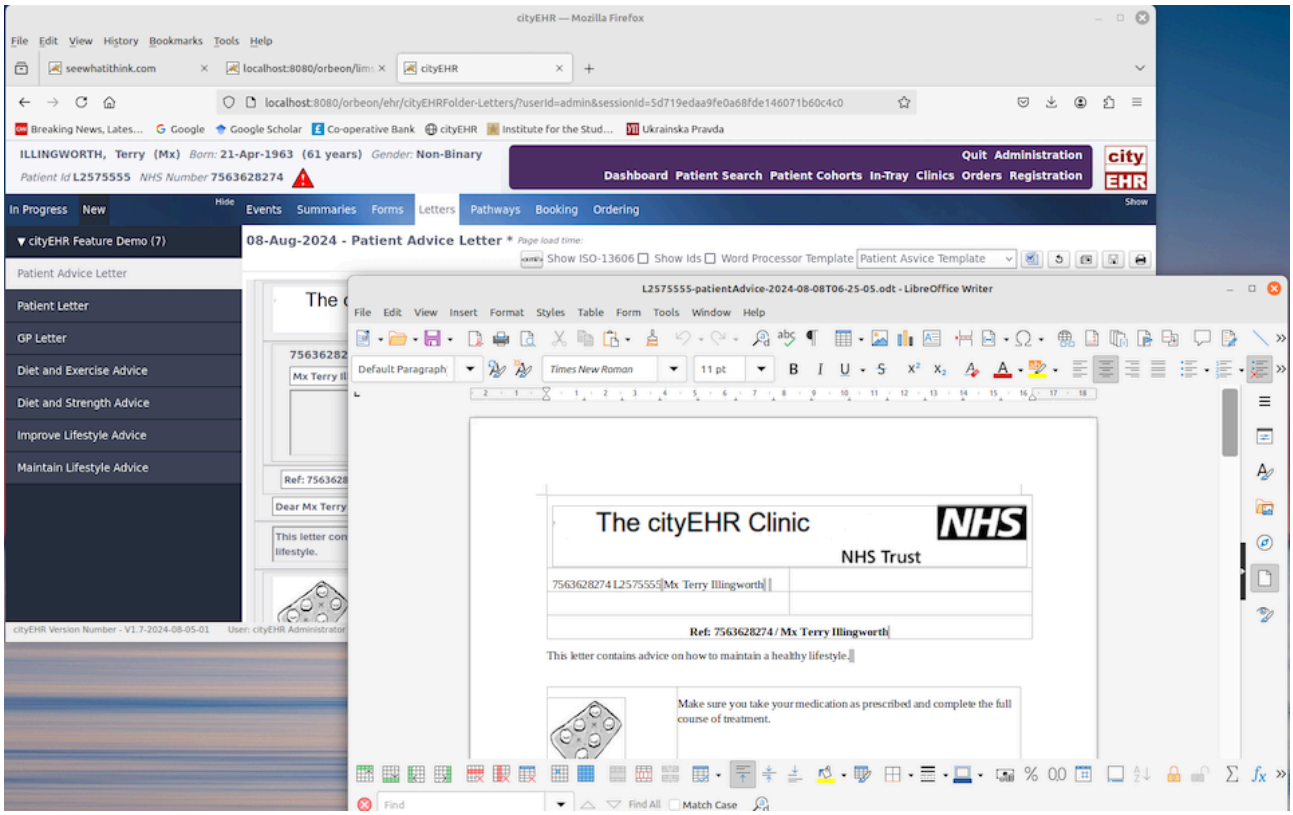
Once your chosen template is loaded you can associate it with one or more Compositions in the clinical information model by selecting Manage Letters | Associate Templates



Associating letter templates with compositions

Using a Template with a Letter

The templates associated with a Letter are available to select when it is being edited. Select the template and press the Wordprocessor button.



Screenshot of Letter template being edited

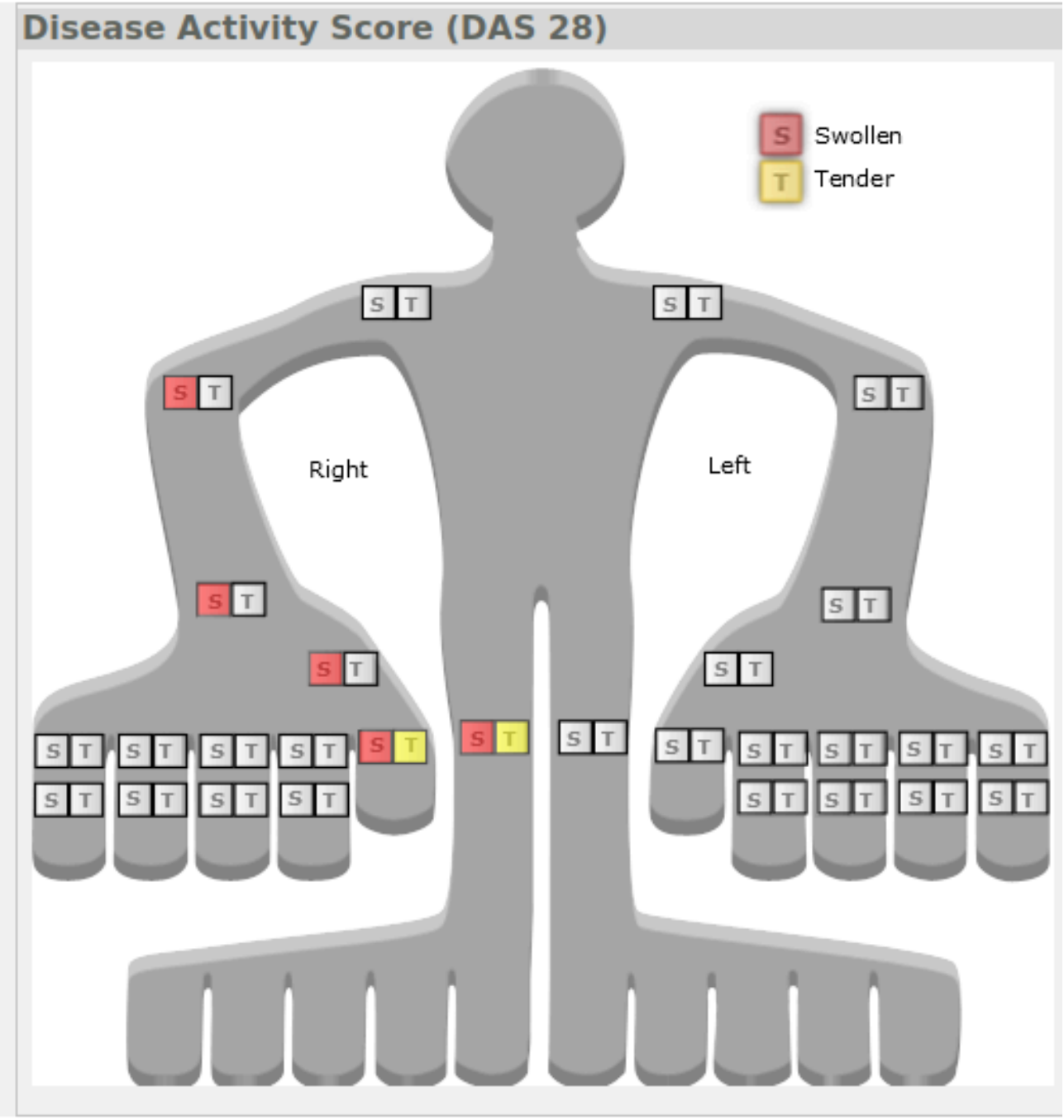
Patient advice letter template

Interactive Image Maps

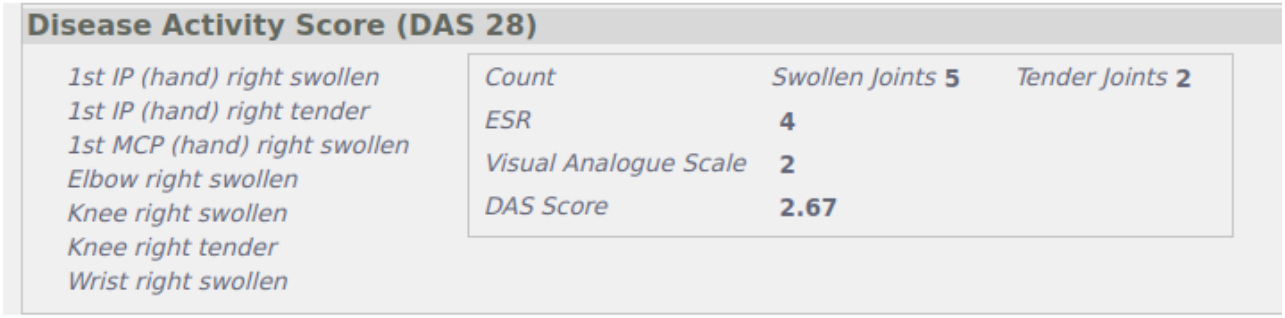
There are two ways in which an Entry in the clinical model can be linked to an image for data entry and several ways in which the image maps themselves can be created. This section explains how the different types of linkage work, using the sample image maps that ship with the Feature Demo application.

Linking to a Simple Entry

The DAS 28 and DAS 68 forms in the Feature Demo contain examples of linking simple entries. The image map is used to set the values of Elements in the Entry.



DAS 28 Image Map Display



DAS 28 Recorded Values

Linking to a Multiple Entry

The Family History form in the Feature Demo contains an example of an image map linked to a multiple entry; each click in the image map adds another entry, with the value of an enumerated value element set through the selection in the map.

Family History - Image Map Linked to a Multiple Entry

Creating a New Image Map

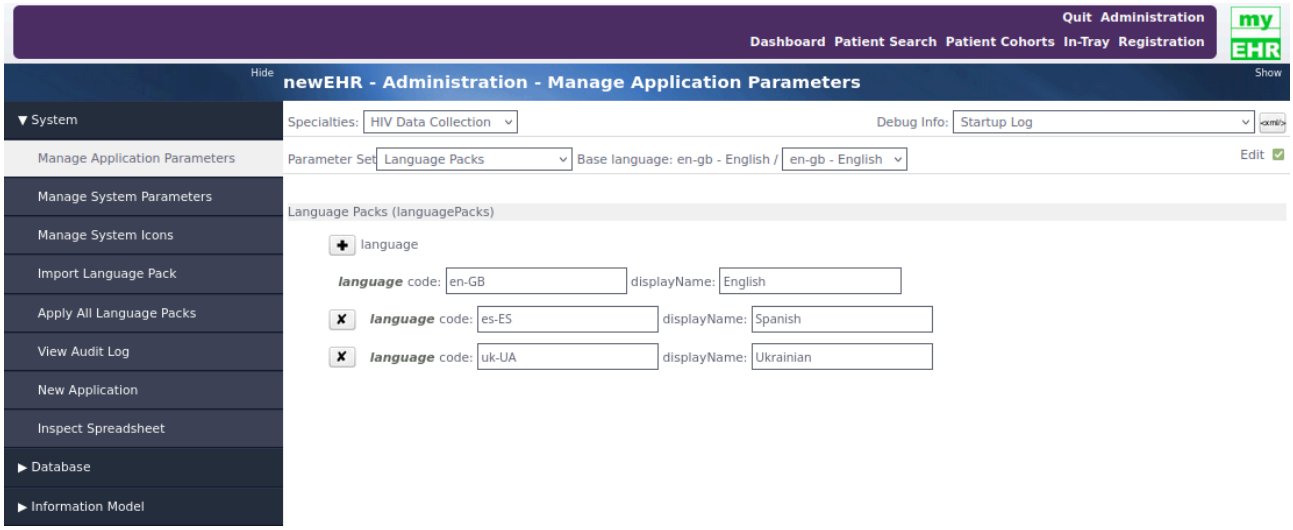
There are several steps to creating a new image map for an Entry in the clinical information model:

1. Set the Rendition of the Entry to ImageMap
2. Create the SVG image map in an external file
3. Upload the SVG image map, linked to the Entry

To illustrate this process you can create a new image map for the

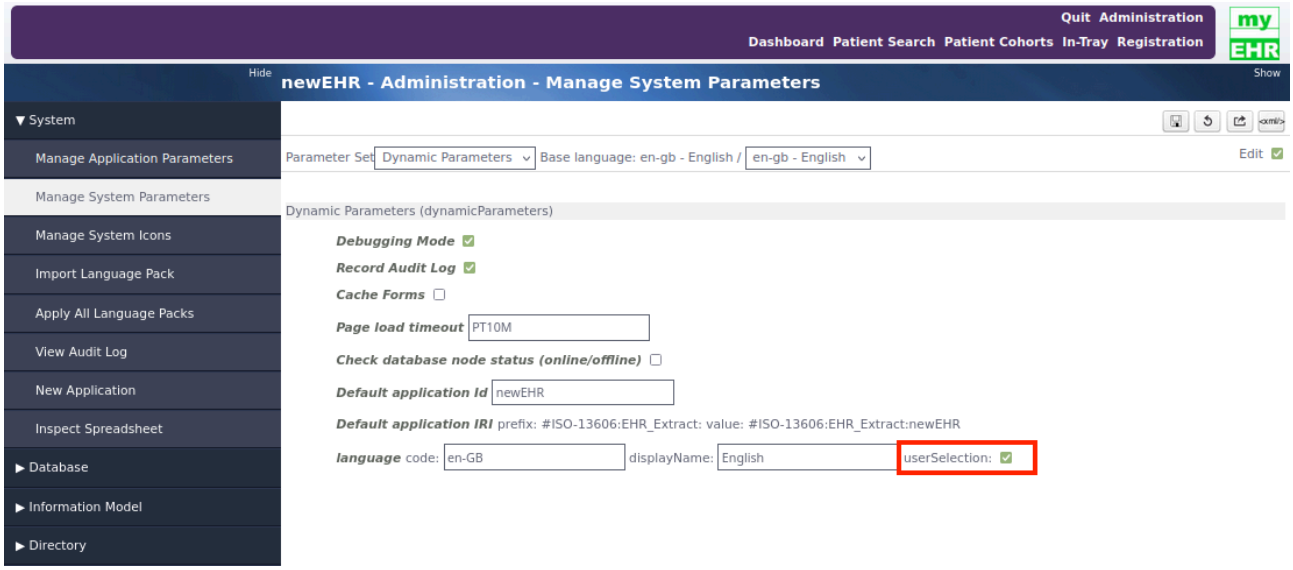
Creating Language Variants

Create Language Pack



Create new language pack

Enable user selection of language

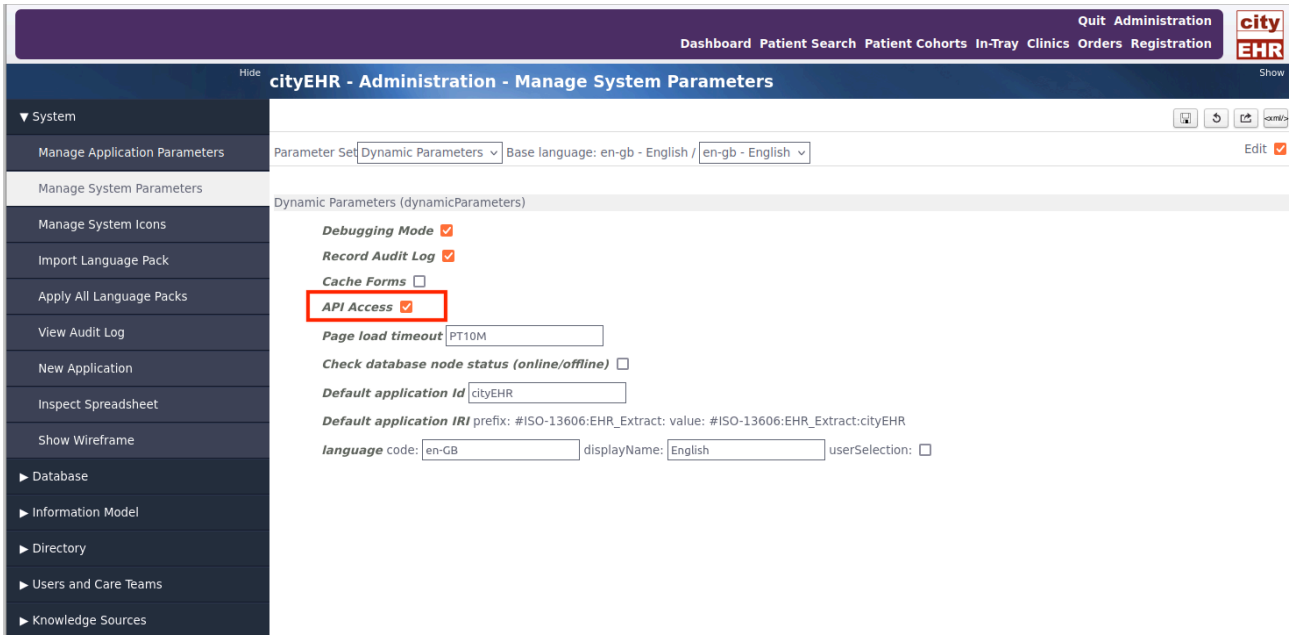


Enable user selection of language

Using the cityEHR API

Enabling API Access

cityEHR has an Application Programming Interface (API) exposed as a RESTful web service. API For any installation API access can be enabled in the Administration page System | Manage System Parameters by clicking the Edit check box, then checking API Access and pressing Save.



Enabling API access

With cityEHR accessible on *http://localhost:8080/cityehr*, the API can be invoked using the URL *http://localhost:8080/cityehr//ehr/api*

When the API is disabled, the response (as shown in the Firefox web browser) is a simple statement with guidance on how to enable it.

```
−<cityEHRapi>
  −<cityEHRapiDisabled>
      API is disabled for this installation. Set access using system parameters Enable API option
    </cityEHRapiDisabled>
  </cityEHRapi>
```

Disabled API message

When the API is enabled the response (as shown in the Firefox web browser) provides a summary of the API specification.

Enabled API message

Each command is shown with an example call, response and a list of its parameters.

API command parameters

There are two styles of API call – either style invokes the same command:

/ehr/api/authenticate/?userId=user&password=secret

or

/ehr/api/?command=authenticate&userId=user&password=secret

Using the cityEHR API

Authenticate and Start a Session

http://localhost:8080/cityehr/ehr/api/authenticate/?userId=admin&password=password

http://localhost:8080/cityehr/ehr/api/authenticate/?userId=admin&password=wrong

1. **Get List of Applications**

http://localhost:8080/cityehr/ehr/api/getApplicationList/?
userId=admin&sessionId=863fa22fd0253e00333d96bb4417973a

Get Patient Demographics

http://localhost:8080/cityehr/ehr/api/getDemographics/?
userId=admin&sessionId=863fa22fd0253e00333d96bb4417973a&applicationId=TSO-13606-EHR_Extract-cityEHR&patientId=K123456789

Get List of Patient Compositions

http://localhost:8080/cityehr/ehr/api/getCompositionList/?
userId=admin&sessionId=863fa22fd0253e00333d96bb4417973a&applicationId=TSO-13606-EHR_Extract-cityEHR&patientId=K123456789

Get Patient Composition

/ehr/api/getComposition/?
userId=admin&sessionId=863fa22fd0253e00333d96bb4417973a&applicationId=TSO-13606-EHR_Extract-cityEHR&patientId=K123456789&compositionId=2023-10-26T20-52-40.71*01-00-CityEHR-Form-BaseRegistration-admin&mime=application/pdf