Scottish Clinical Information Management in Practice (SCIMP)

NHS Scotland Clinical Models
Introduction to using Clinical Knowledge Manager (CKM)

Contents

Background

To exchange clinical information in a computable way clinical computing systems need to express, store and exchange clinical data in the same format. In the clinical domain requirements and definitions of clinical concepts can change very quickly and need to be adaptable to new purposes, so a traditional waterfall style of development is often not the most effective way of delivering or managing this requirement.

In Health Informatics the concept of a **'Clinical Archetype'** is firmly established. This is a definition (a model) of a clinical 'concept' such as a 'weight', a 'height' or a 'blood pressure' that can be used by a computer system. The archetype contains places to store all the **items (elements)** of data that are needed to fully define the concept. This may include, for example, a 'clinical term' to describe the concept such as 'Blood Pressure', and places for values or comments. Terms would normally be taken from a standard clinical terminology (Read Codes or SNOMEDCT), whereas values and comments may be numbers or text added by end users.

For example, a computer model of a 'Weight' record would need values for a Date of Measurement, a Description, a Value and Units of Measurement for the value. A record in a computer system could look like:

- **Date:** 14-Oct-2013
- **Description:** 'O/E Weight'
- **Value:** 70.5
- **Units of Measure:** kg

From these archetypes clinical software suppliers can provide **'templates'**. Templates use only the elements of archetypes that are needed for the current task, leaving out things that may not be of relevance at that time. For example, a 'blood pressure template' may not use the 'blood pressure archetype' elements of 'cuff size' or 'position', if not required for that particular application. The template author may only want to use 'Systolic' and 'Diastolic' elements to provide a simple form for recording blood pressures. Templates can use elements from different archetypes at the same time, allowing for the provision of complex forms and reports for systems users.

Designing clinical archetypes requires the contribution of clinicians. As the primary end users of archetypes, clinicians need to be confident that they are complete and safe; that they enable accurate and meaningful recording of clinical data in computer systems; and that they support clinical care. In other words: clinical review is essential to make the archetype 'fit for purpose'.

The challenge lies in gathering the clinical requirements in a format that allows rapid and agile development and deployment, and in bringing together clinical users and system developers. The solution we are working with to solve this makes use of a clinical archetype and template editing tool called 'Clinical Knowledge Manager' (CKM).

Clinical Knowledge Manager is an internet based, collaborative tool that provides functionality to design, edit, review and publish clinical archetypes and templates. It can export to XML formats, allowing for rapid deployment. Version tracking and reviewing functions allow for flexibility in adapting to new or changed requirements. Face to face meetings of the reviewers are not normally required. Use of the archetypes in real systems is only ever possible when the communities of reviewers agree that they meet their requirements, and when value in implementation is clear and apparent. By distributing the work of designing clinical models systems suppliers benefit by not having to duplicate work done elsewhere and by achieving agreement on data structures, reducing the need for mapping and re-engineering of their software.
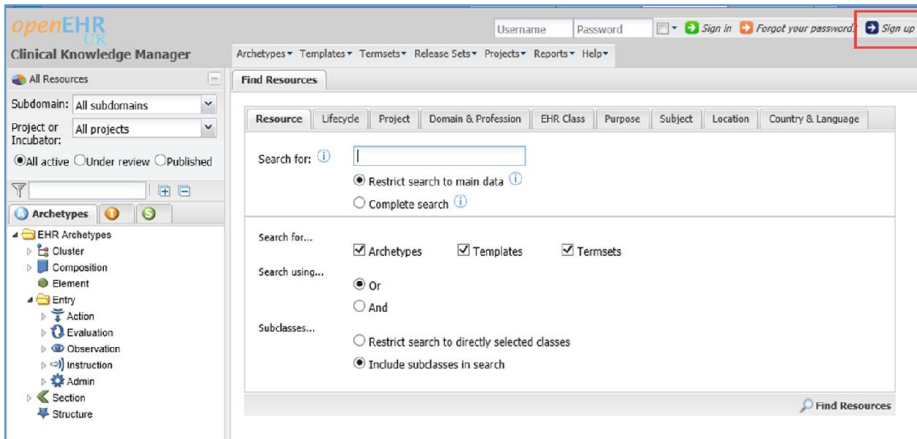
The Clinical Knowledge Manager website

The dedicated web-based application that will be used to allow review and comment on the proposed standards is called 'Clinical Knowledge Manager' and can be found at:

http://clinicalmodels.org.uk

Registration

The first task for new users is to register with the system.

Click on the 'Sign up' button shown in the web browser.

Fill the form that is displayed, the anti-spam 'Captcha' and then click on 'Next':

On the next page, shown below, check 'on' 'I am available as a reviewer'. Then you can select any health domains or roles that apply to you, or just click 'Save and Finish'.

This form then displays (although of course with your own 'username'!):
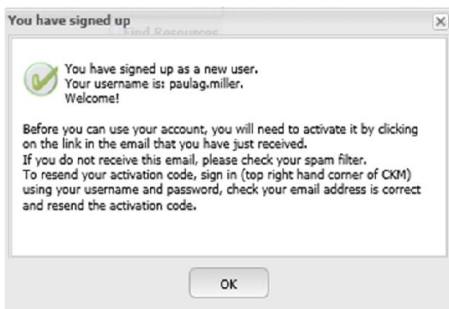
Log into your e-mail and follow the instructions. The e-mail will look like this:
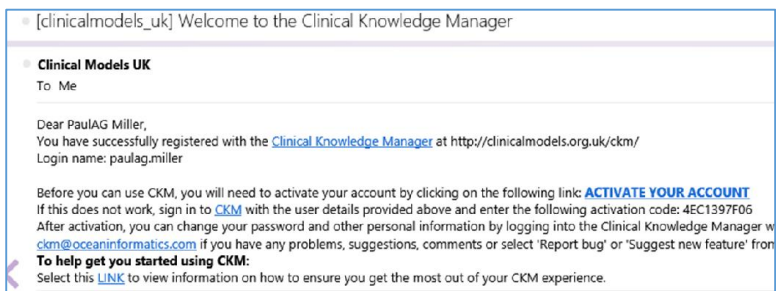
Click to activate your account.

The CKM web page will open displaying the confirmation of registration dialog box, and you can now log into your account.
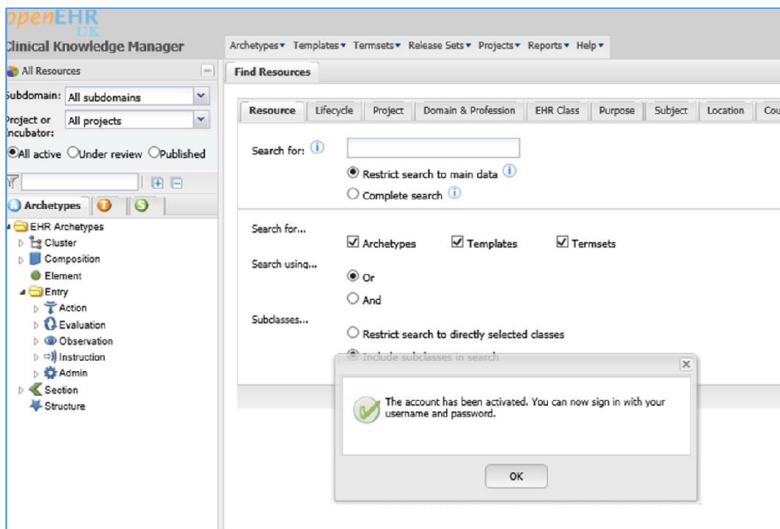
Sign in using your login details:
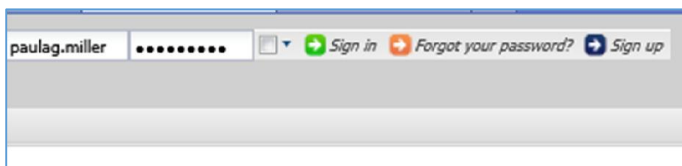
Your default CKM display will now look something like this:
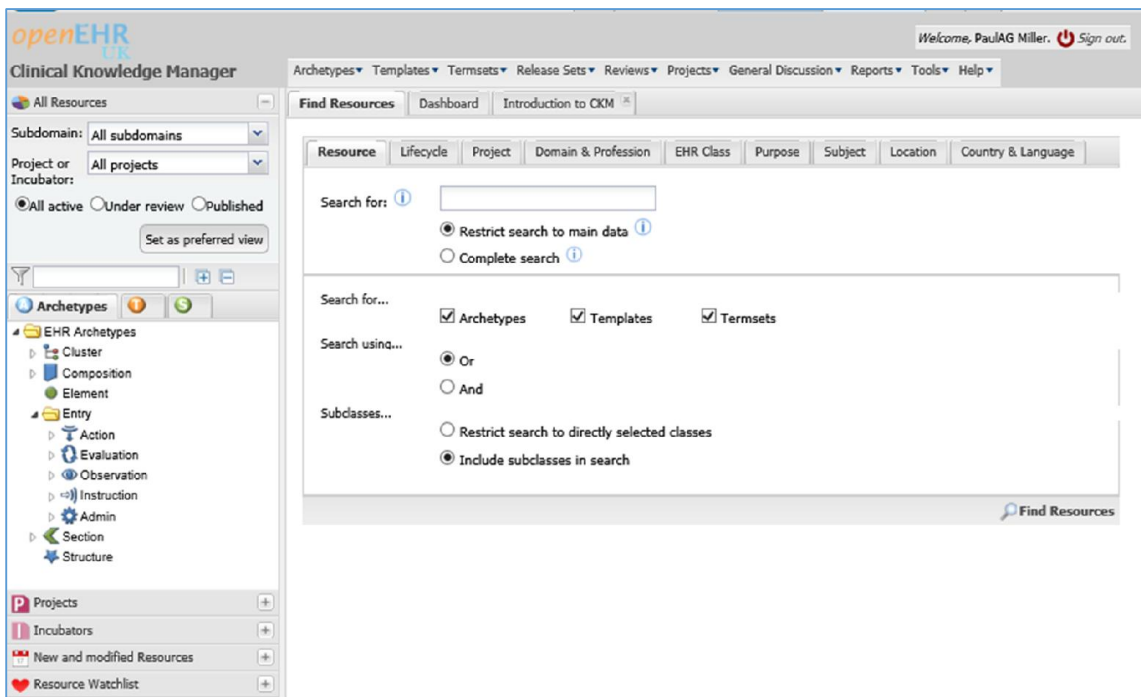
Finding your way around

The interface to CKM contains a lot of information and navigational tools, so takes a little learning to find the item that interests you, and some configuration of user options to make this simple. For our purposes we are interested in the "NHS UK Medication and Drug Allergy Models Project".

By default, when you initially log in, the left hand navigation pane (called the 'Accordion tabs') will show you the 'All Resources' tab, showing 'All subdomains' and 'All projects':
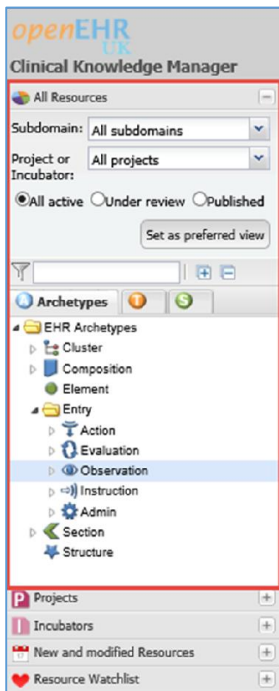
Note you can collapse or expand these frames by clicking on the plus or minus sign. For example, if you click on the minus:
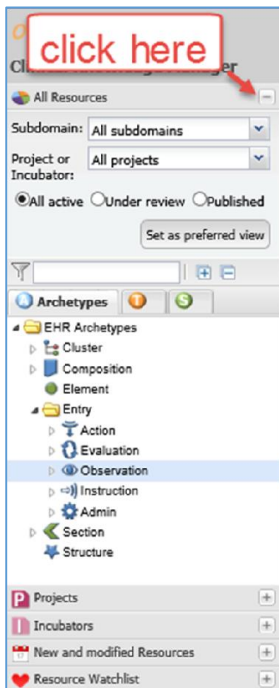
The view collapses all the tabs:

The archetypes we are interested in are in the Project called "NHS UK Medication and Drug Allergy Models'. You can find this by clicking on the 'plus' sign next to 'Projects':

Then navigating to the project by clicking down the list:
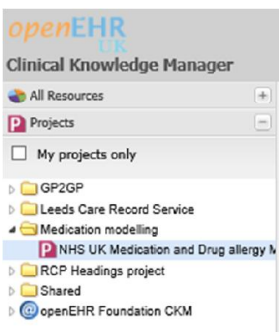
Double click on this line and the right hand pane will open the Project home page for this project in a new tab.

Project Home Page
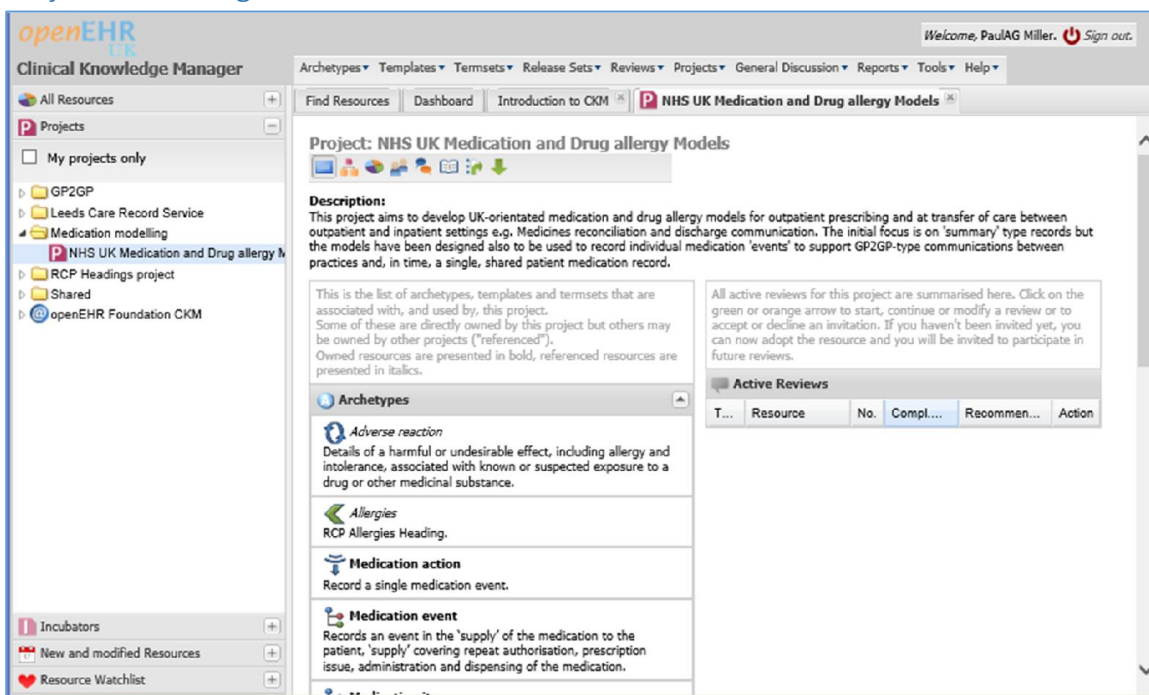
There are some things you can do to make it easier to reach this Project Home Page.

Set Preferred View

Using Internet Explorer, expand the 'All Resources' tab and select the subdomain 'Medication Modelling' and then the Project 'NHS Medication and Drug Allergy Models' as shown below:
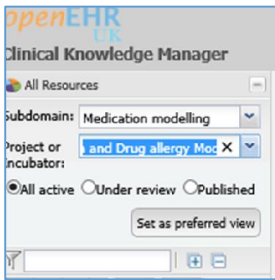
Next, click on 'Set as preferred view'. A confirmation dialogue box will open. Click 'OK' on this.

This now sets an option so that when you log in the left hand side Accordion tabs will now display a tab titled 'Preferred view'. You should set this as your default open tab for when you log in.

Make 'Preferred View' the default

To do this, on the right hand side at the top menu, click on 'Tools' and then 'Options':
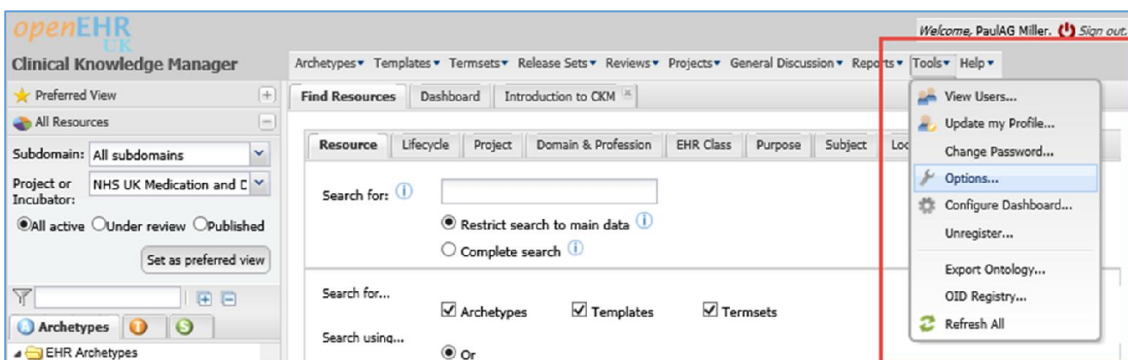
Change 'Open left hand accordion on sign in' to 'Preferred View' as below:
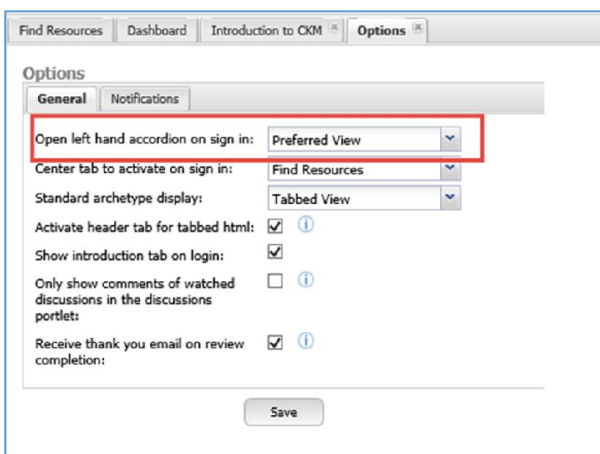
Then click 'Save'.

Test it by logging out, then back in again. Your default screen on log in should now look like this:
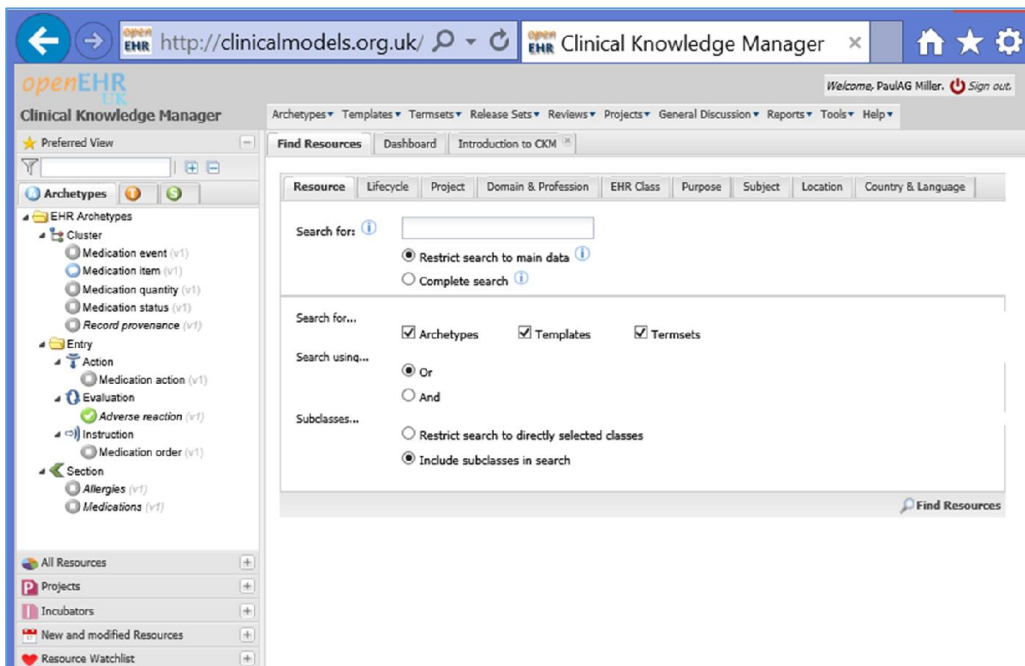
Preferred View Tabs

The 'Accordion tab' view on the left now has three tabs, for 'Archetypes', 'Templates' and 'Termsets'. At this stage we are only interested in 'Archetypes' and 'Templates' as shown below:
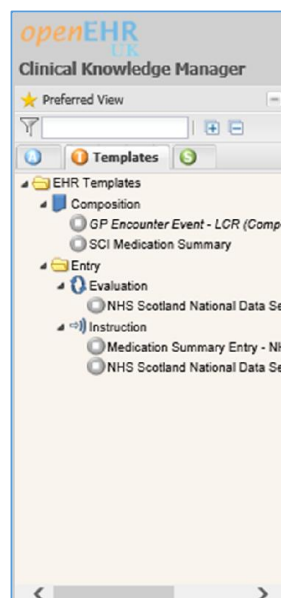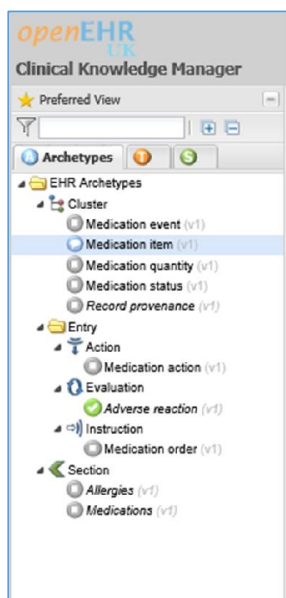
Archetypes are shown as listed under 'Cluster', 'Entry' or 'Section'. For our purposes these are not important for basic reviewing. The archetypes themselves are shown with three possible icons to represent the status of the Archetype:

	Draft
	Under review
	Published

To open an item for display in a tab on the right hand side, double click it. For example, double click on 'Medication Item' on the left view and it will open as a tab on the right:
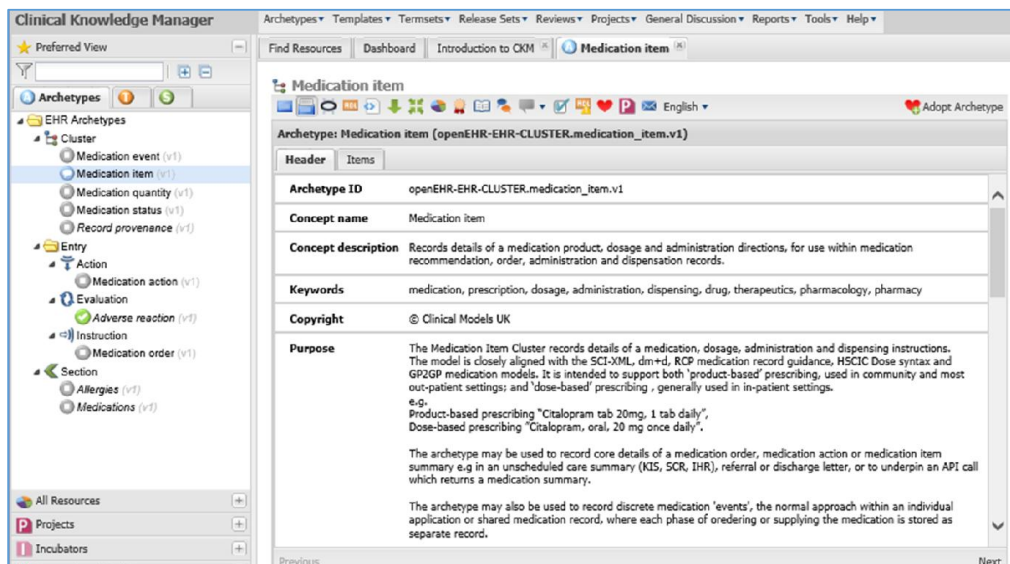
The default view of the archetype is called the 'tabbed view':
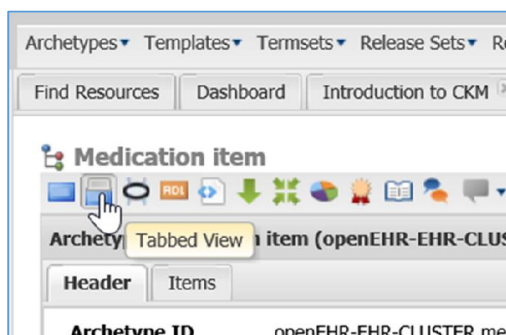
This shows the 'Header' and the 'Items' of the archetype in different tabs.

The various icons along this row all change the display to show different information about the selected archetype. Not all of these are needed for reviewing purposes.

On the 'tabbed' view the 'Header' tab lists some basic information about this archetype. The 'Name', 'Description', 'Purpose' and 'Use' are the most useful sections. The start of the 'Purpose' section for 'Medication Item' is reproduced below:

> *"The Medication Item Cluster records details of a medication, dosage, administration and dispensing instructions.*
> *The model is closely aligned with the SCI-XML, dm+d, RCP medication record guidance, HSCIC Dose syntax and GP2GP medication models. It is intended to support both 'product-based' prescribing, used in community and most out-patient settings; and 'dose-based' prescribing , generally used in in-patient settings."*

It is helpful when reviewing an archetype or template to first read this header information.

Clicking on the 'Items' tab will list all the 'items' or 'elements' that are included in the archetype. For example, as described earlier, an archetype for 'Weight' might have 'items' of 'Value' and 'Unit of Measure'.

The top of the 'items' section for the 'Medication Item' archetype is shown below:

Each item is shown with its Name, Data Type, whether it is mandatory or optional and its relationship to the archetype; a textual description of the item is shown in the next column, and lastly any constraints on values.

Many users find the 'Mind Map' view of the archetype helpful. Clicking on the next button along will change the view to this:
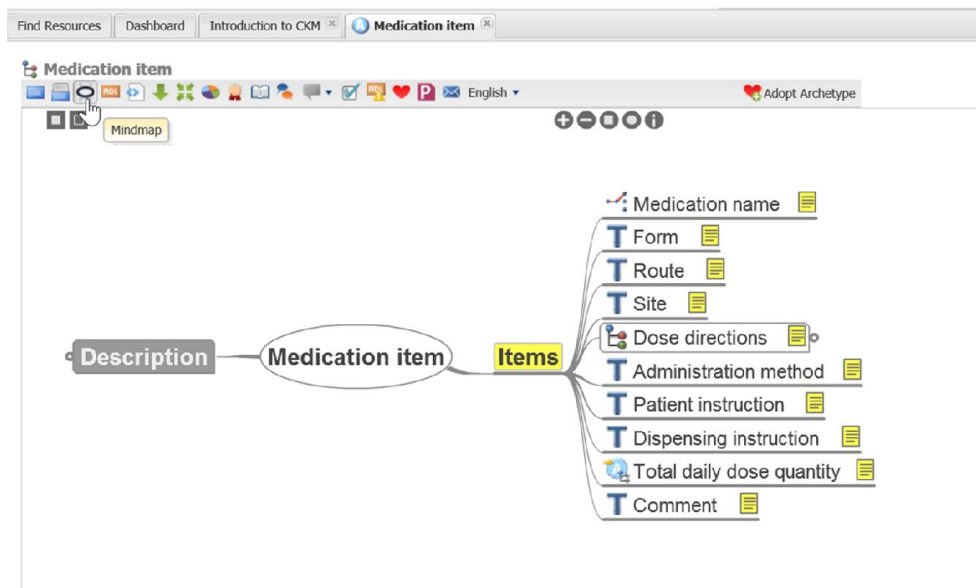
Clicking on or hovering the mouse pointer over the items will display additional information such as the description. For example:

Other useful views include:

Archetype History:

Status:

Resources:

XML View

This may be of interest to developers.

Adopt an Archetype

For each archetype or template that you are interested in you need to 'Adopt' it. By doing this you will then be notified of any changes, discussions or invitations to contribute to a review.

To adopt an archetype simply click on the 'Adopt Archetype' button:
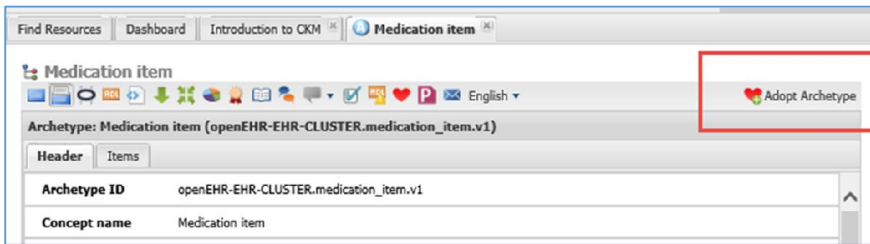
You should do this for all archetypes and templates listed in this project.

Dashboard

Clicking on 'Dashboard' tab will show you all the Archetypes, Templates and any other resources you have 'Adopted', and allow you to change their settings. Note you can drag windows around in this display to, for example, display the 'Watchlist' as the first item.
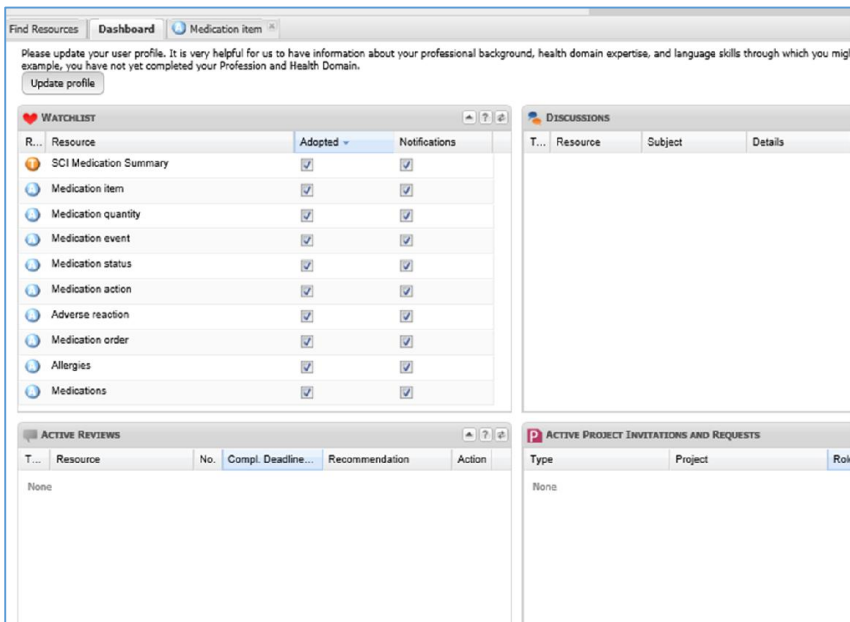
Reviews

As a reviewer we hope that you will be able to take some time to contribute to reviews of the archetypes and templates. For archetypes you have adopted, when an editor starts a review round, you will receive an invitation to contribute by e-mail. This will look something like the message below:

You can select any one of the four options.

Review Template Now

If you opt to 'Review template now' a web browser will be started and, after you have logged in, it will open the 'Invitation' page for this review. For example:

Note that there is a video available that provides some introductory advice on carrying out reviews. This is from the Australian equivalent of our CKM but the concepts and processes are the same.

Instructions for Archetype Review Video:

http://www.youtube.com/watch?v=Uy-LfrG5U7Y
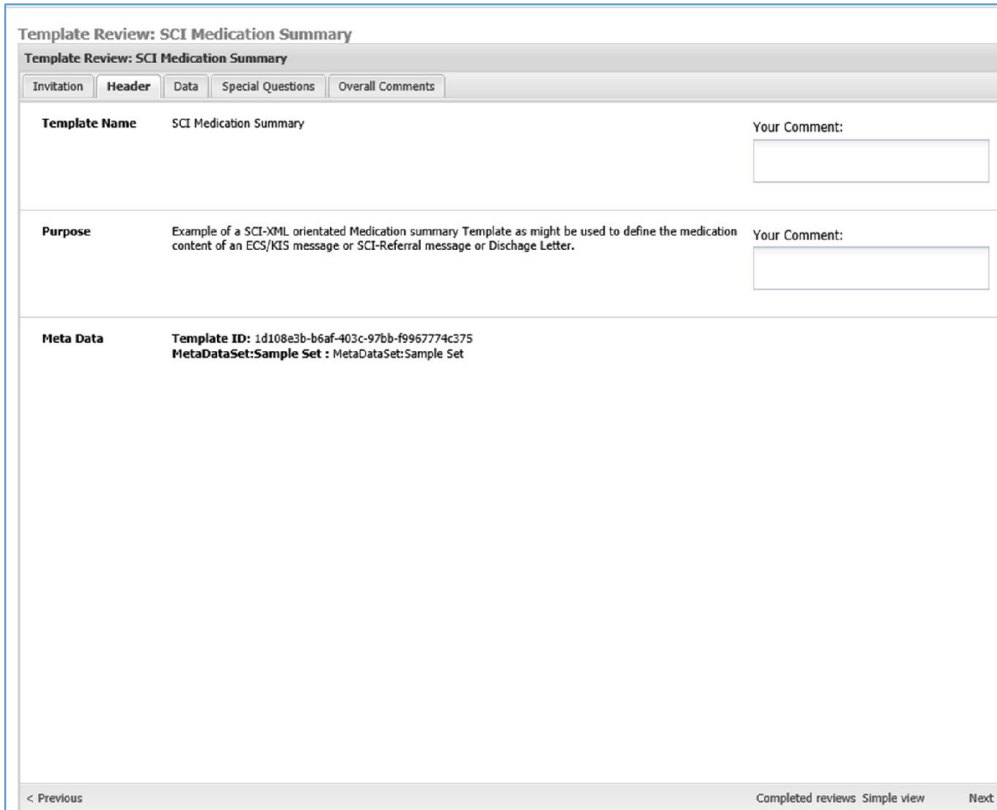
It is important to read the Invitation tab commentary. This will describe what is being reviewed, the purpose of the archetype or template and the scope of the review.

The editor will have setup the review into sections as shown by the tabs, for example:

Clicking on 'Next' at the bottom right of the review window will take you onto the next tab. For example, if we click 'Next' on this Review, we will open the 'Header' tab:

You can of course click on any of the tabs shown to move there directly, or click 'Previous' or 'Next' to move back and forward one step.

Review 'View'

When reviewing an archetype or template the view presented is the same as the usual 'tabbed' view shown earlier, but with additional boxes for you to enter comments about that element of the archetype. For example:

Other views may be available directly from the Review pane to help you understand the archetype. In the example above a 'Simple view' is also available by clicking on 'Simple view' on the bottom line:

This will open the 'Simple view' in a new tab:

Note you cannot add comments to this view – that needs to be done in the Review tab. Using the icons in the toolbar you can also elect to look at the archetype's details, or in other views such as mind map.

Return to the 'Review' tab to add your comments to the archetype review.

View other reviewer's 'Completed Reviews'

You may find it helpful to look at other reviewer's comments while carrying out your own review. Clicking on the 'Completed Reviews' link on the bottom line will open a tab to allow you to do this:
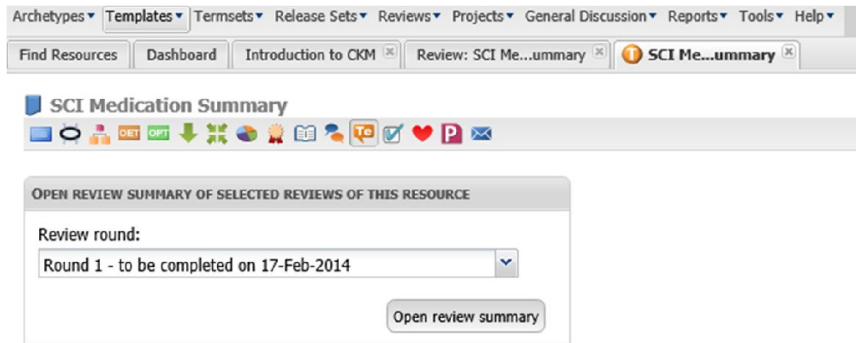
Select the chosen 'Review round' and click on 'Open review summary' to see other reviewer's comments.

Adding comments

You do not need to comment on every item. If your opinion is that there is nothing new to add then you can move straight to the last tab, 'Overall comments' and complete your review as outlined below.

CKM allows for a broad range of experts from clinicians, developers and eHealth to contribute to reviews of clinical models. Your own individual area of expertise brings value to the review process, so please comment as you feel appropriate. Ask questions and raise concerns where there is something that does not make sense to you, or where you identify omissions, errors or extraneous details not required to meet the use case.

If you are unsure if your comment is relevant, review the 'Invitation' tab which should give guidance on the purpose and scope of the review and the archetype. In general it is better to add a comment to an element if you are uncertain that it is meeting the archetype's purpose from your perspective.

Designing and reviewing archetypes is not a 'binary' process, where there is necessarily a right or wrong answer. The published models will often be a compromise agreement to allow the archetype to meet the defined use cases and actually be implemented in real systems. Sometimes this means editors will adapt the archetype to reflect consensus comments from reviewers, but equally it may require a pragmatic limitation of further change to avoid 'scope creep'.

When commenting please consider:

Is the clinical content correct?

In your opinion does the archetype contain all the elements to define the clinical concept for your use? For example, if reviewing a Blood Pressure archetype, most clinicians would want to have a data element for 'Systolic', but would you also wish to see a data element for the device used for taking the reading?

Are the names and descriptions applied to the data elements correct?

For example, would it be correct in your context to call a blood pressure measuring device a 'BP machine', 'Sphygmomanometer' or just 'Measuring device'? And how would you describe this so that what you were referring to was clear to others?

Is anything inappropriate?

Are there any data elements that you think irrelevant, spurious or misleading in this context?

Terminology Issues

'Terminology' refers to the clinical coding systems that the archetype will use to define some of its data elements. This would commonly be Read Codes, SNOMED CT or dm+d. There may be specific issues regarding the suggested use of terminologies with which you disagree or wish to have refined.

Typos and grammar

Please comment on any grammar and typographical issues you notice – they are almost inevitable and the 'many eyes' approach of CKM should help to identify and correct them.

Completing your review

Work through the tabs and elements and comment as you wish. For example:

Once you are happy with the review, open the 'Overall comments' tab. You must select an option for 'Overall recommendation':

Now click on 'Save and submit review'.

A confirmation message is displayed:
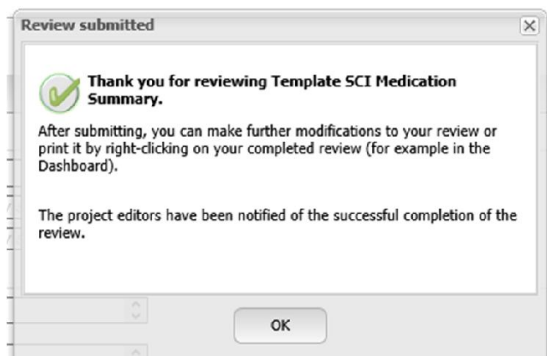
Updating your review

You can amend your review comments until the editors close the review. Normally the invitation to participate in a review will include an end date for that review.

To amend your comments, navigate to the archetype or template page and click on the 'Reviews' icon on the toolbar. This will open a tab to allow you to return to and add or amend any comments.

What happens next?

Submitted reviews are sent to the editing team for that archetype. Generally editors will then meet, normally virtually, to discuss the review round and accept, reject or further investigate the reviewer's comments. Comments will be entered by editors to allow you to see the outcomes of your reviews, and of course you can contact the editing team directly or use the archetype's 'Discussion' tab to continue any debates.

Any Questions?

If you have any comments or questions arising from this document, or from using CKM, please contact SCIMP via the website and let us know.