
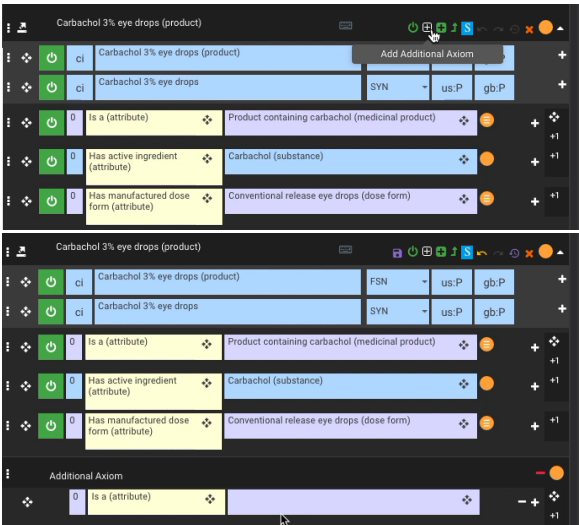


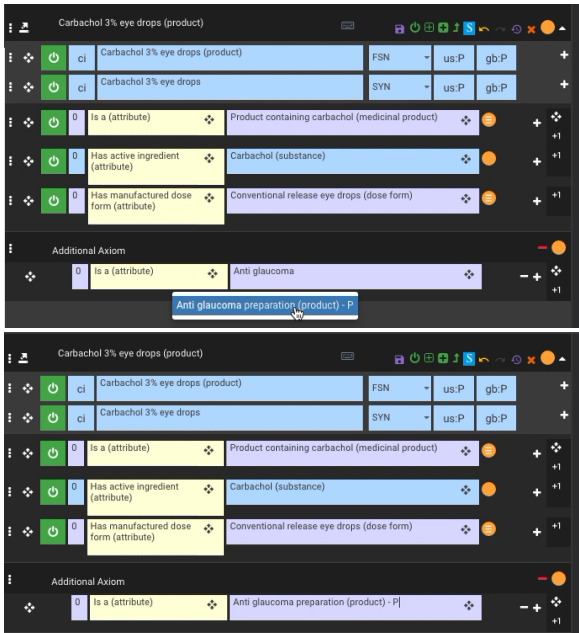
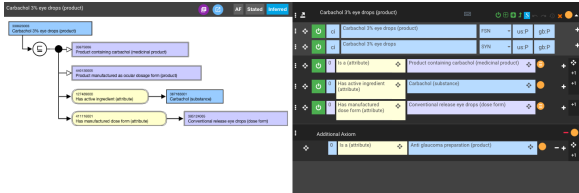
# Authoring - Description Logic (DL) Support Features

DL features in the concept edit panel (Additional Axiom and General Concept Inclusion)

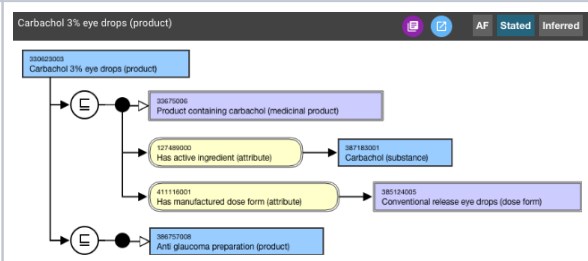
What is Description Logic?

How do I add an Additional Axiom?

Steps	Reference	Description Logics (DLs) exist to enable a reduction in content maintenance costs with a concurrent increase in content quality. Processing power and reasoning algorithms have improved such that a more expressive DL is now practical to use in SNOMED CT.
Open a concept for editing - for example: Carbachol 3% eye drops (product). The concept header contains the Add Additional Axiom button. The button icon is an outline rounded square containing a "plus" symbol.		The principle benefit of more DL features is the ability to represent content in a more fully systematised and thus more machine processable way, to enable the following benefits:
Press the Add Additional Axiom button. A new Additional Axiom panel will appear below the concept relationships containing a single empty Is a attribute.		<ul style="list-style-type: none"><li>increased efficiency, consistency, precision and quality of authoring through reduced manual effort to organise content</li><li>lower costs to author and maintain content through reduced manual effort</li><li>a more complete and consistent product that is, as a consequence, more usable (for implementers and end users) and attractive (to drive adoption and implementation)</li><li>reduction in the cost of assessing the impact of modelling change, because changes also become systematically describable (and transformable).</li><li>simplification of content modelling by removing workarounds</li><li>close interoperability with an international standard, OWL, allowing easier application of other standards and tools</li><li>explicitly specified logic profile for Description Logic features used in SNOMED CT</li></ul>
		<h3>Transitive and Reflexive Properties</h3> <p>Attribute concepts now have the ability to declare DL property characteristics as <b>Transitive</b> or <b>Reflexive</b>.</p> <p>Property characteristics are currently maintained via the Terminology Server Application Programming Interface (TS API). Changes can be made via service requests to the technical team.</p>

Use type-ahead search (or drag and drop from the search or taxonomy panels) to enter and select a target for the <code>Is a</code> attribute.		<p><b>Example concept JSON data structure showing a Transitive property characteristic</b></p> <pre> {   "effectiveTime": "20110131",   "moduleId": "900000000000012004",   "active": true,   "released": true,   "conceptId": "123005000",    "fsn": "Part of (attribute)",   "definitionStatus": "PRIORITY",   "preferredSynonym": "Is a",    "propertyCharacteristics": [     "Transitive"   ],    "descriptions": [],   "relationships": [],   "isLeafStated": true,   "isLeafInferred": true } </pre>												
Save the concept in the edit panel.		<p>When saved via the TS API, the changes are written into the Owl Axiom Reference Set as shown in the following examples:</p> <table> <tr> <th>moduleId</th><th>refsetId</th><th>referencedConceptId</th></tr> <tr> <td>900000000000012004</td><td>733073007</td><td>116680003</td></tr> <tr> <td>900000000000012004</td><td>733073007</td><td>733928003</td></tr> <tr> <td>900000000000012004</td><td>733073007</td><td>733928003</td></tr> </table>	moduleId	refsetId	referencedConceptId	900000000000012004	733073007	116680003	900000000000012004	733073007	733928003	900000000000012004	733073007	733928003
moduleId	refsetId	referencedConceptId												
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View the saved concept with the new additional axiom. Note that the default Inferred view diagram does not change.		<p><b>Property Chains</b></p> <p>OWL DL Property Chains can now be used within the authoring platform to infer additional concept properties during classification.</p> <p>These inferred attributes appear in classification results along with all other inferred relationships.</p> <p>Property chains are currently maintained via the TS API. Changes can be made via service requests to the technical team.</p>												

Switch the concept diagram to show the Stated view. Note the presence of the new additional axiom.



### Example

This feature allows **|Has active ingredient|** to be linked with **|Is modification of such that a medicinal product that has an active ingredient which is the modification of another substance, could classify as a child of a product containing the less modified substance.**

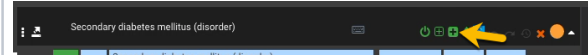
This behaviour is critical to controlling the effect of changes to the **|Substance (substance)|** hierarchy on other hierarchies.

## How do I add a General Concept Inclusion?

### Steps

Open a concept for editing - example: Secondary diabetes mellitus (disorder). The concept header contains the Add GCI Axiom button. The button icon is a solid rounded square containing a "plus" symbol.

### Reference



## Additional Axioms

Additional Axioms are a new part of SNOMED CT concepts. Each Additional Axiom is like another mini concept definition including definition status and a set of stated relationships. These are presented and maintained through the concept edit panel in the same way as stated relationships, visually located below the existing stated relationships of the concept. Axioms have a named concept on the left and an expression on the right.

The relationships within each additional axiom follow MRCM rules just like the stated relationships. At least one is-a relationship is required in an axiom. The concept editor panel supports creation, editing and removing of axiom relationships. There is no released or active state on axiom relationships - they can always be modified or deleted.

Each axiom of a concept is necessarily true. The attributes from all axioms are in the inferred form and are inherited by children through inference. The normal form process may reduce these attributes if a more specific attribute or group of attribute is present, in the same way that is does for attributes from the stated relationships. Attributes in an additional axiom are inferred on the named concept and its descendants.

### Example

Concept A has axiom A1 (stated relationships) and A2.  
Concept B has axiom B1 (stated relationships).  
Concept A subsumes Concept B - Concept B gets the inferred attributes of axiom A1 AND A2.

## General Concept Inclusion Axioms

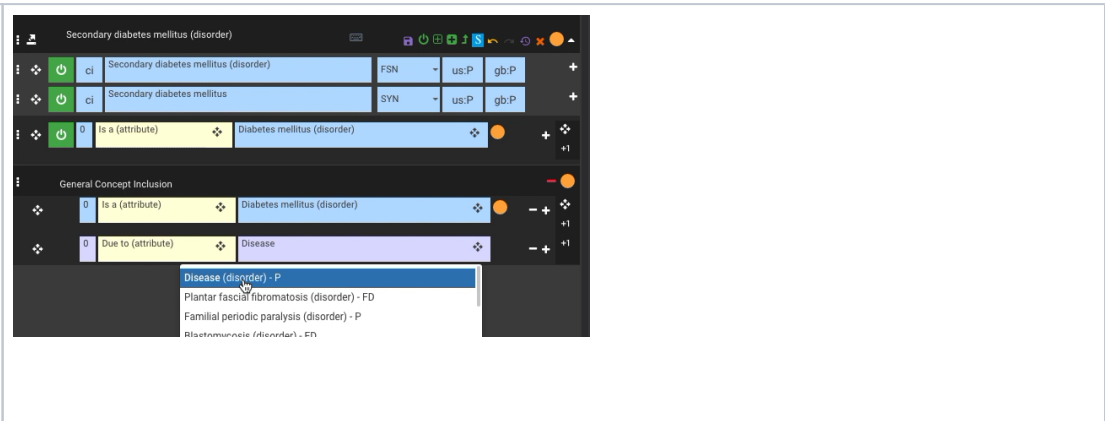
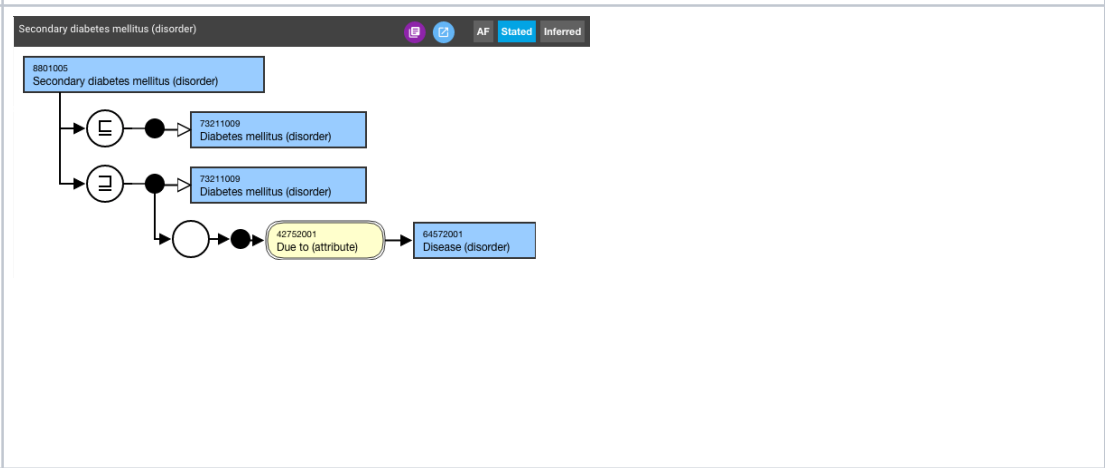
Press the Add New Relationship "plus" button within the GCI panel. Use type-ahead search to enter and select Due to (attribute) as the relationship type.



Each GCI is recorded as a separate axiom expression within a separate member of the Owl Axiom Reference Set. A GCI has a definition status which is represented using a `SubClassOf` or `EquivalentClasses` axiom expression.

[illegible]Description Logic Enhancements -  
Briefing Paper

[https://www.w3.org/TR/owl2-syntax/#Property\\_Hierarchy\\_and\\_Simple\\_Object\\_Property\\_Expressions](https://www.w3.org/TR/owl2-syntax/#Property_Hierarchy_and_Simple_Object_Property_Expressions)

<p>Use type-ahead search to enter and select Disease (disorder) as the target value for the new Due to attribute.</p>	
<p>Save the concept.</p>	
<p>Show the stated view of the concept diagram. Diagram shows empty GCI box with reverse subtype indicator.</p>	

## How do I modify a General Concept Inclusion?

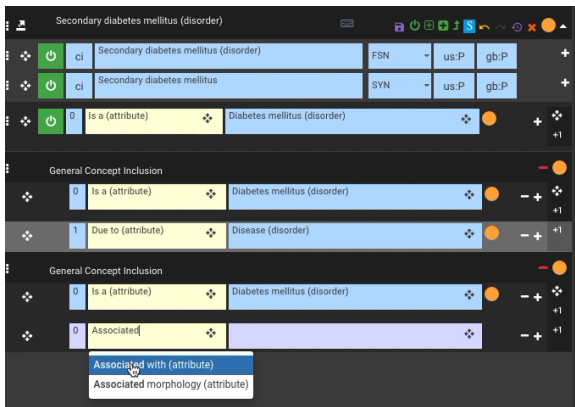
Steps	Reference
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With a GCI present in the concept edit panel (eg via the steps above), use the Add GCI Axiom button in the concept header to add a new GCI to the edit panel. Drag and drop the concept parent Diabetes mellitus (disorder) as the target for the new GCI. Is a relationship.

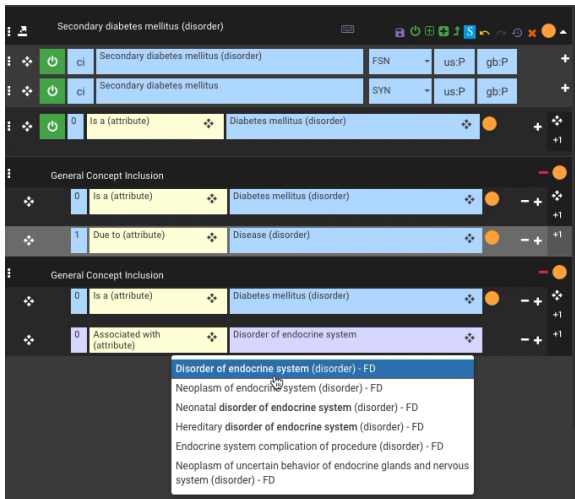


Using the Add General Concept Inclusion button in the concept header, add another GCI to the concept edit panel.

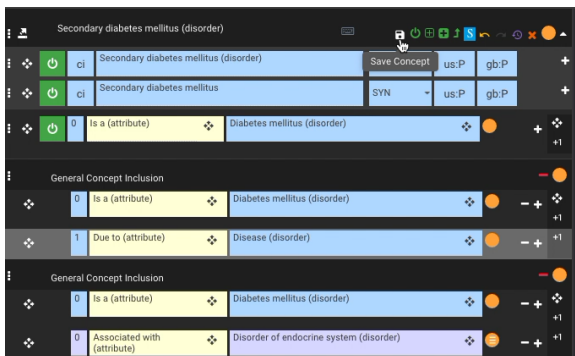
Press the Add New Relationship "plus" button within the GCI panel to add a new relationship. Use type-ahead search to enter and select Associated with (attribute) as the relationship type.



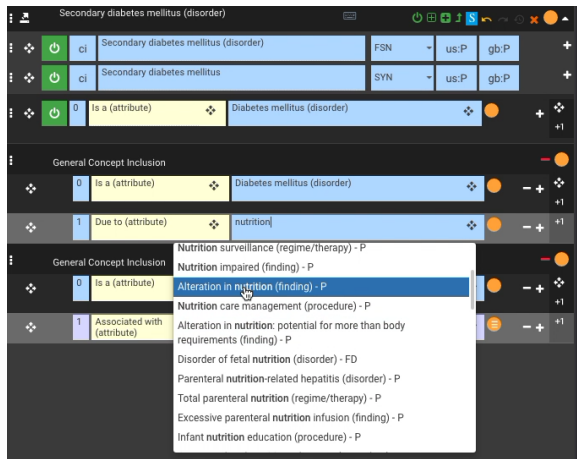
Use type-ahead search to enter and select (for instance) Disorder of endocrine system (disorder) as the target value for the new Associated with relationship.



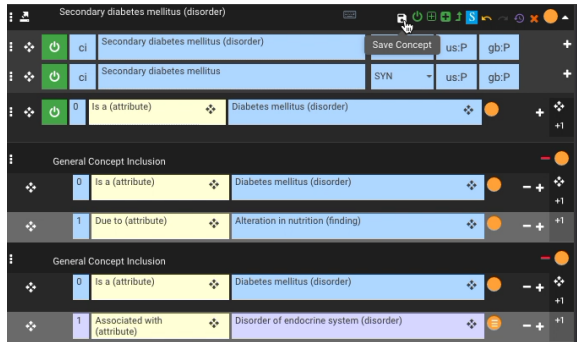
Save the new GCI via the concept header Save Concept button.



Modify the original GCI, for example using type-ahead search to find and select **Alteration in nutrition (finding)** as a new target for the Due to attribute.



Press **Save** in the concept header to save the GCI attribute changes.



Confirm the changes via the **Stated** view of the concept diagram.

