

# 10.1 Query Interface

When querying patient records containing SNOMED CT-enabled data, a variety of interfaces may be adopted to support the user in authoring queries. In this section we first consider user interfaces for querying SNOMED CT, and then look at user interfaces for querying SNOMED CT enabled patient records.

## Terminology Query Interfaces

When querying clinical data, it may be necessary to first define a subset of SNOMED CT concepts (e.g. disorders or procedures) that may then be compared against values in a patient record. A number of different options exist for creating these SNOMED CT subsets, including:

1. Selecting individual SNOMED CT concepts (i.e. extensional definition)
2. Authoring queries directly using a query language (i.e. intensional definition)
3. Authoring queries using a structured form (i.e. a form which generates an intensional definition)

### Selecting Individual Concepts

This approach uses a SNOMED CT browser to allow individual SNOMED CT concepts to be searched, selected and added to a subset. For large subsets this can be quite time consuming, however it is quite suitable for smaller subsets. A number of commercial tools are available which help to perform this task, including [Apelon's](#) Distributed Terminology System and [B2i's](#) Snow Owl terminology server. [Figure 10.1-1](#) below illustrates Snow Owl's authoring interface for Simple reference sets.

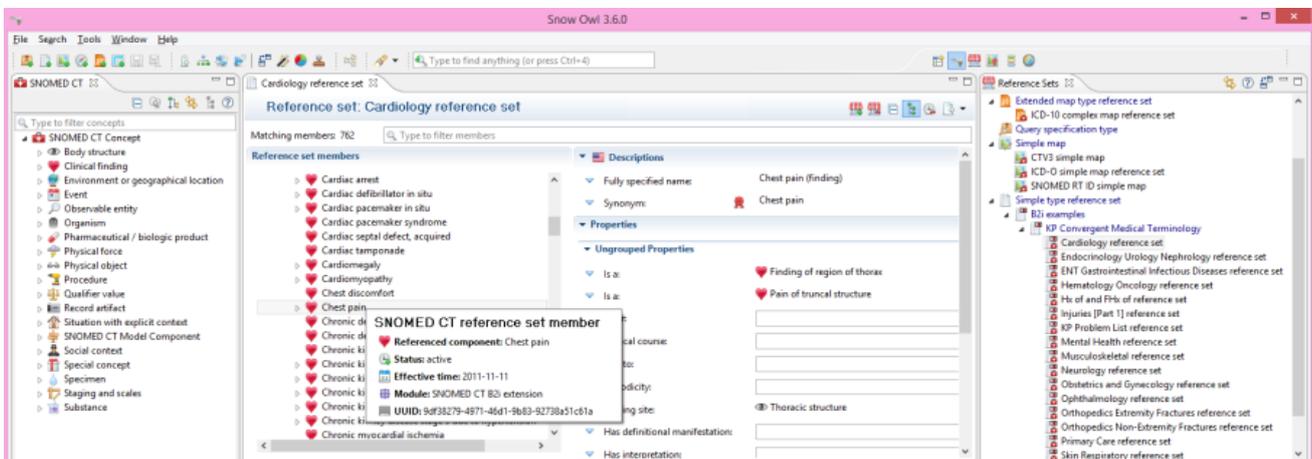


Figure 10.1-1: B2i's Snow Owl interface for authoring Simple Reference Sets

## Authoring Queries Using a Query Language

Other user interfaces allow a subset to be defined using a text-based query written using a predefined query language (e.g. SNOMED CT Expression Constraint Language, or SNOMED CT Query Language). These interfaces tend to be for the more technical user. However, some clinical users may be taught to use these interfaces if required.

Two examples of this style of interface are illustrated in [Figure 10.1-2](#) and [Figure 10.1-3](#). [Figure 10.1-2](#) shows the NHS Data Migration Workbench query interface, while [Figure 10.1-3](#) shows B2i's Snow Owl query interface.

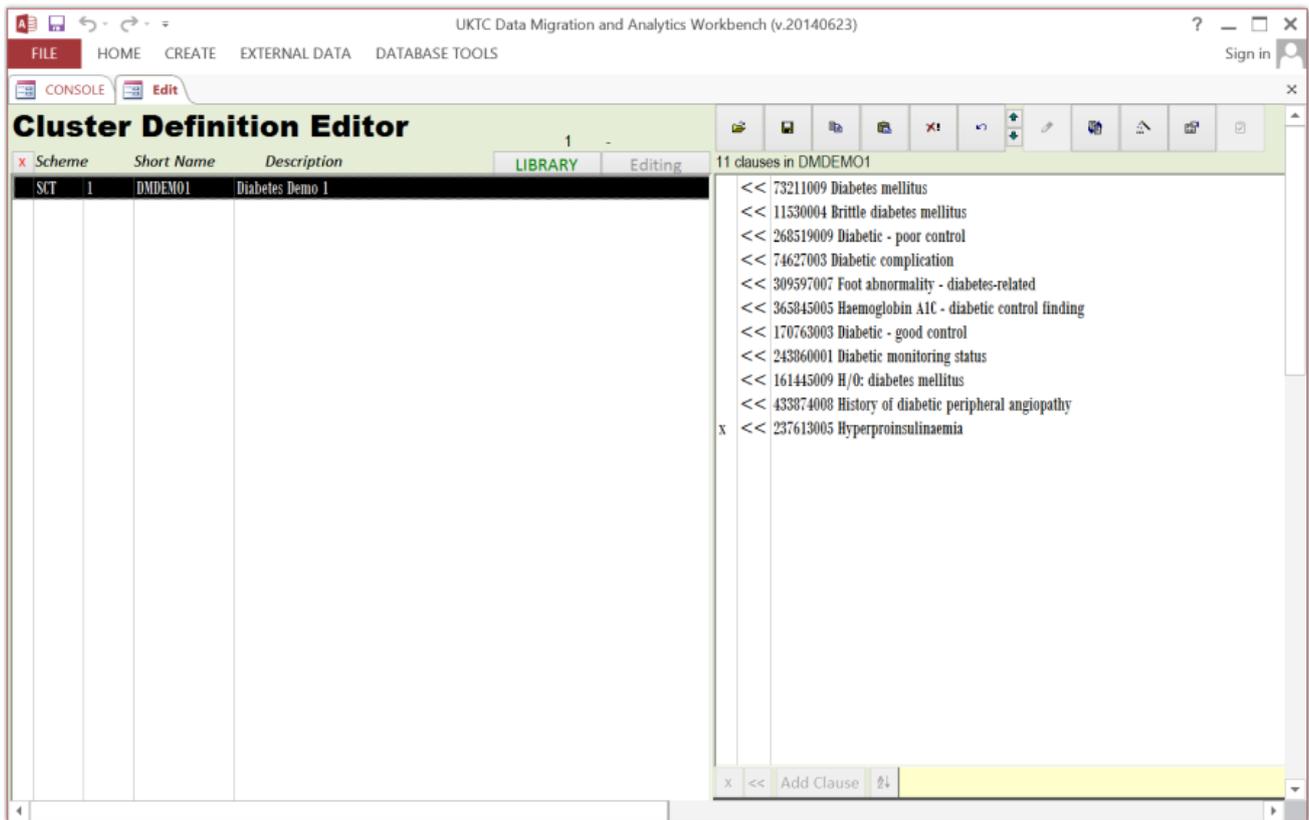


Figure 10.1-2: NHS Data Migration Workbench interface for authoring queries

Infectious arthritis.escg

```

1 <<404684003|Clinical finding| :
2 116676008|Associated morphology| = <<23583003|Inflammation|,
3 363698007|Finding site| = <<39352004|Joint structure|,
4 246075003|Causative agent| = <<410607006|Organism|

```

Search

Concept search - SNOMED CT ESCG query: [Results: 45]

Type to filter search results

Concept ID	Preferred term	Concept status
51646002	Streptococcal arthritis	active
33937009	Lyme arthritis	active
21534009	Arthritis due to E. coli	active
44743006	Gonococcal infection of joint	active
59484000	Chlamydial polyarthritis	active
201466005	Staphylococcal arthritis and polyarthritis	active
53664003	Gonococcal spondylitis	active
367488007	Tuberculosis of joint	active
48245008	Bacterial arthritis	active
89764009	Mumps arthritis	active
25738004	Tuberculous synovitis	active
444765007	Inflammation of joint due to Streptococcus suis	active
71299003	Salmonella arthritis	active
372938004	Acute suppurative arthritis due to bacteria	active
410020008	Polyarthritis due to Erysipelothrix rhusiopathiae	active

Figure 10.1-3: B2i's Snow Owl interface for authoring text-based queries

## Authoring Queries Using a Structured Form

A third style of user interfaces for authoring SNOMED CT subsets uses a structured form. A form-driven query tool may allow the user to select an operator (e.g. 'memberOf', 'descendantOf'), the concept or subset to which this operator is applied (e.g. 'Example problem list', 'Disorder'), and then one or more attribute values to limit the set of concepts returned. (Note: The attribute name may either be selected from a list, or hard coded on the form). Once the form is completed, a text-based query is automatically constructed from the selected values, and executed against SNOMED CT. This style of interface can be designed to allow users to exploit the rich semantics of SNOMED CT, while shielding them from the underlying technical details. Figure 10.1-4 illustrates how a generic form-driven interface for authoring SNOMED CT queries works. Vendor products which implement form-driven interfaces for authoring SNOMED CT queries include B2i's Meaningful Query web interface (as shown in Figure 10.1-5).

### Query Form

<p>Operator:</p> <div style="border: 1px solid gray; padding: 2px;">Members of</div> <div style="border: 1px solid gray; padding: 2px; margin-top: 2px;">Ancestors of</div> <div style="border: 1px solid gray; padding: 2px; margin-top: 2px;">Descendants of</div> <div style="border: 1px solid gray; padding: 2px; margin-top: 2px;">Members of</div>	<p>Concept:</p> <div style="border: 1px solid gray; padding: 2px;">Example Problem List</div> <div style="border: 1px solid gray; padding: 2px; margin-top: 2px;">Observable s List</div> <div style="border: 1px solid gray; padding: 2px; margin-top: 2px;"><b>Problem List</b></div> <div style="border: 1px solid gray; padding: 2px; margin-top: 2px;">Procedure List</div>
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#### Refinements

<p>Attribute:</p> <div style="border: 1px solid gray; padding: 2px;">Finding site</div> <div style="border: 1px solid gray; padding: 2px; margin-top: 2px;"></div>	<p>Value:</p> <div style="border: 1px solid gray; padding: 2px;">Endocrine system</div> <div style="border: 1px solid gray; padding: 2px; margin-top: 2px;"></div>
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<sup>^</sup> 700043003 | Example Problem List Subset | :  
 363698007 | finding site | = 113331007 | endocrine system |

Figure 10.1-4: A generic form-driven interface for authoring SNOMED CT queries

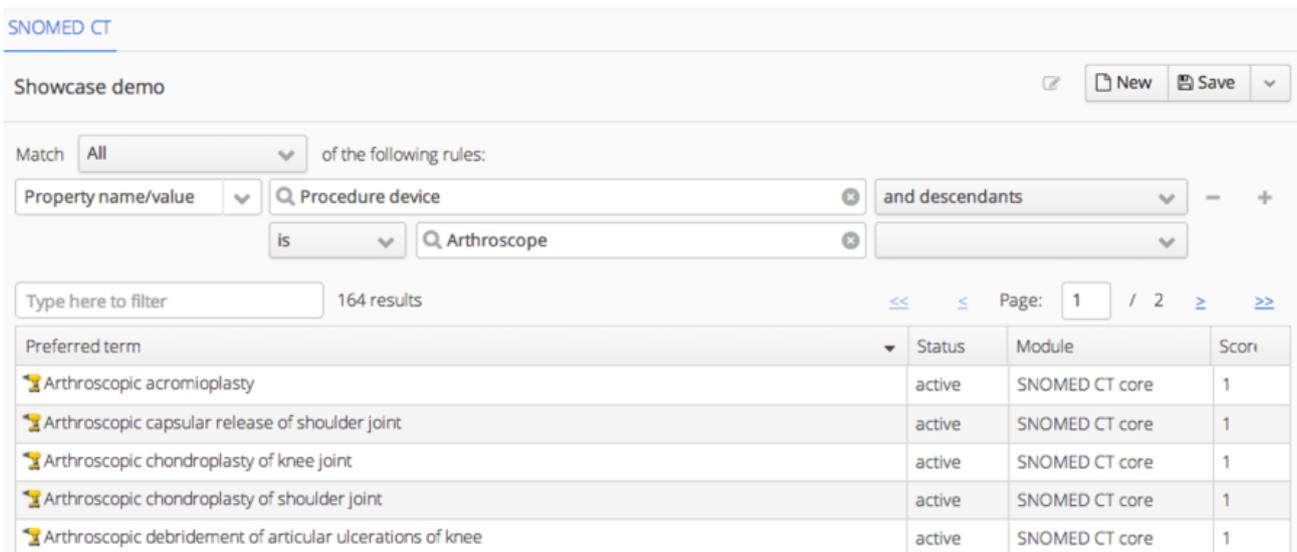


Figure 10.1-5: B2i Snow Owl's Meaningful Query web interface

## Patient Record Query Interfaces

When SNOMED CT queries are integrated (or embedded) into patient records queries, additional constraints are often added across demographic data (e.g. age, address) and episode of care data (e.g. healthcare provider, dates). These data items are often referred to as 'concrete values' and are typically not included in a terminology. A number of styles of interfaces are used to author patient record queries that include SNOMED CT content, including:

1. Free text semantic search
2. Queries using a predefined language (e.g. SQL, XQL, OQL or AQL)
3. Queries using a structured form (including both SNOMED CT and concrete value criteria)

Figure 10.1-6 shows an example of a search for 'diabetes' using Cerner's Semantic Search tool. This tool enables clinicians at the point of care to search in real time through a patient's multiple charts, pathology reports and other documents for topics such as 'heart disease' and 'diabetes', using SNOMED CT's hierarchical and non-hierarchical relationships.

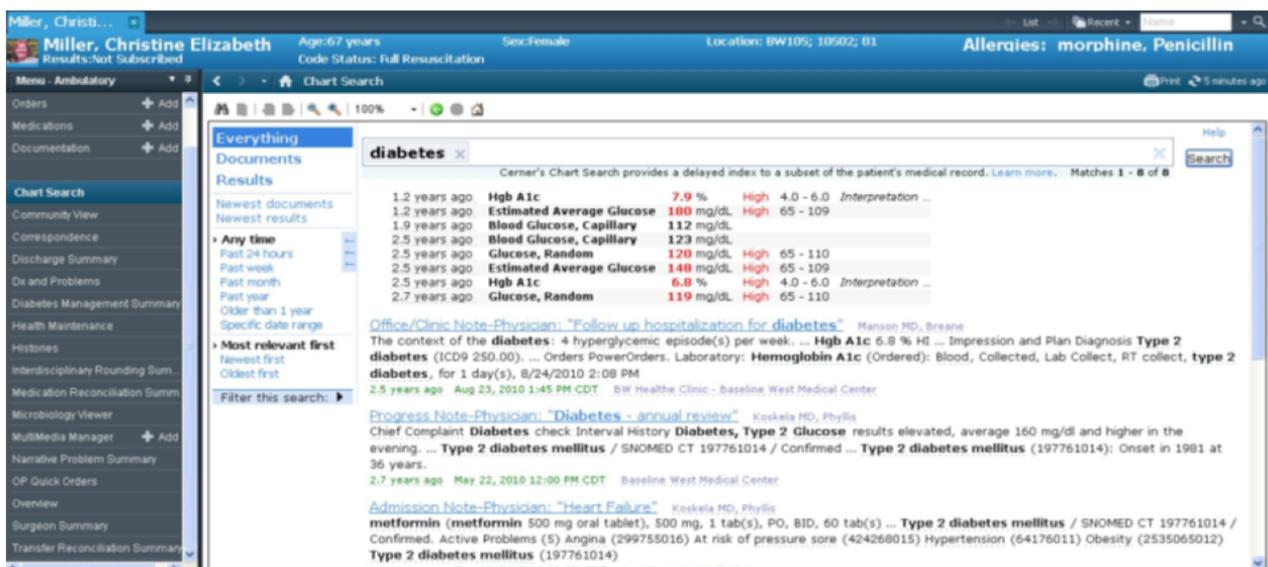


Figure 10.1-6: User interface of Cerner's Chart Search/Semantic tool

